C W Report

Chemical Week

August 28, 1954 Price 35 cents

Busy future for fertilizers: more production, more demand, more competition . . . . . p. 35

Paintmaker McClellan: as NAM chief, he urges executives to take the broad view . . . p. 16

Competitors find they can cut costs, synergize efforts by ganging up on mutual problems p. 44

Is the pilot plant a needless luxury? Could be, if research can do the job . . . . . p. 66

Target: broad-spectrum blight-fighters for tobacco; market's big for ideal p

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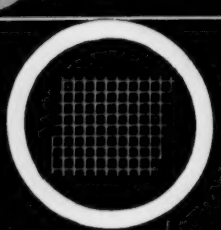

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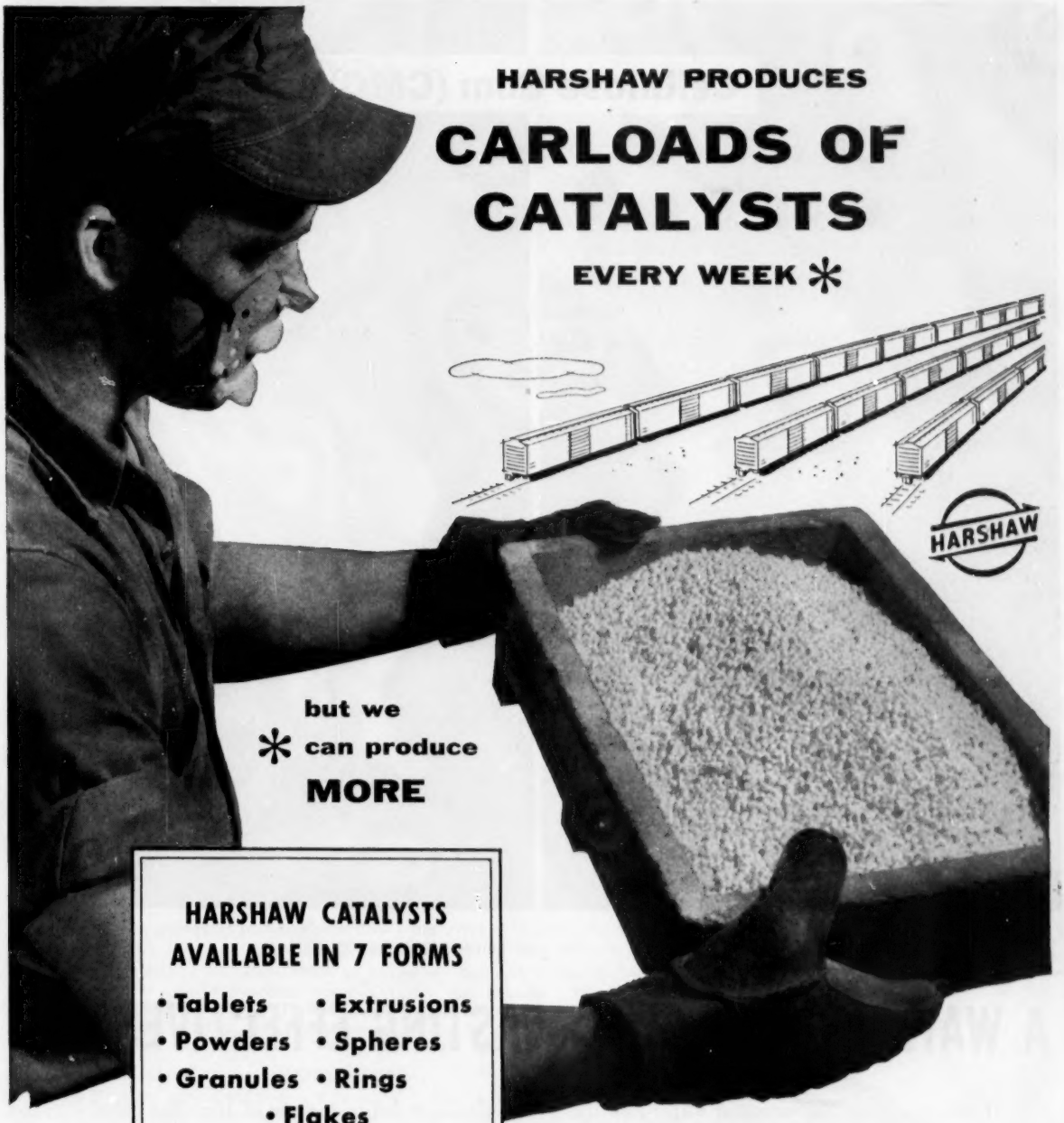

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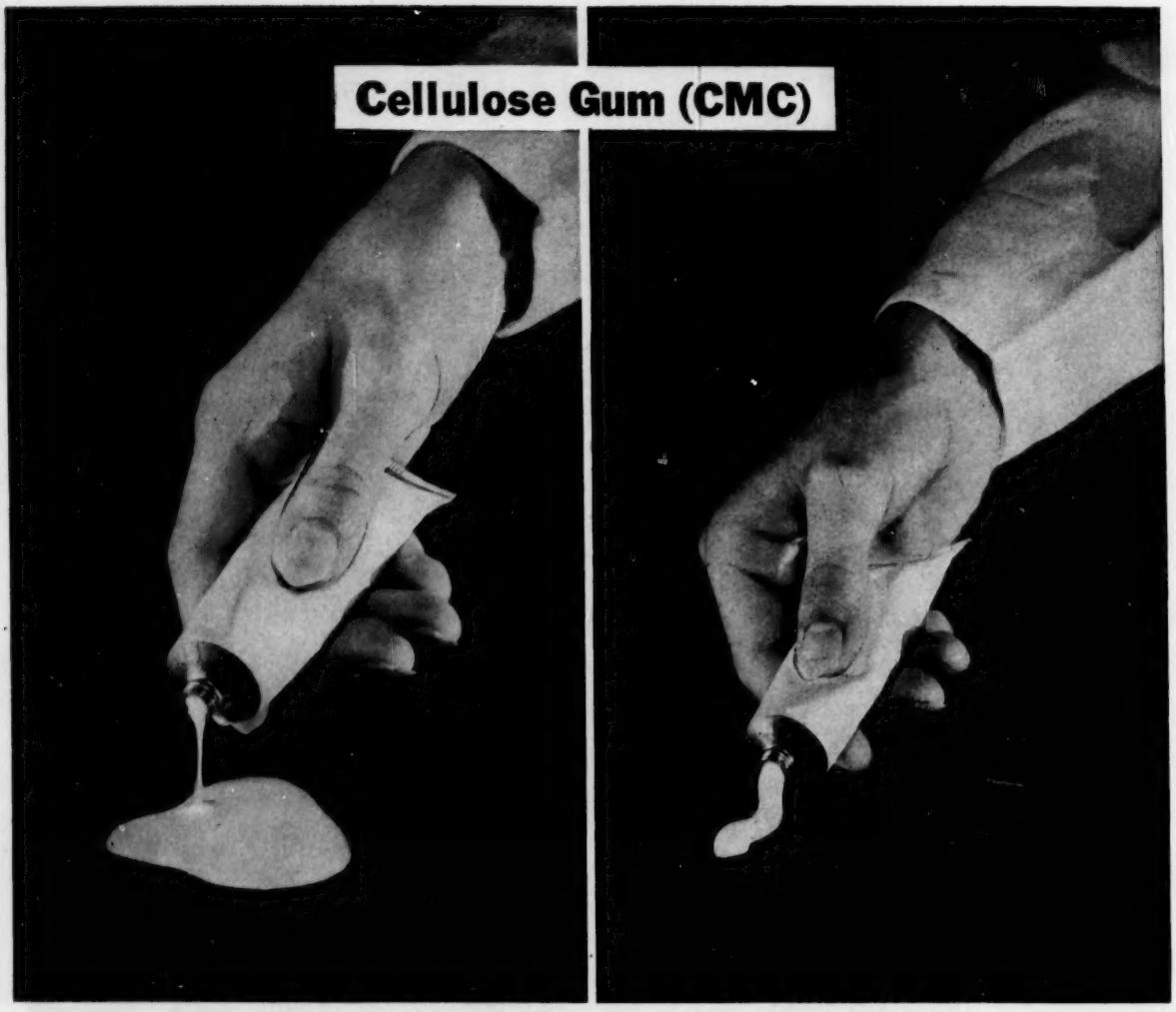

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Chemical Week

Volume 75 **August 28, 1954** Number 9

OPINION	4	**PRODUCTION**	44
NEWSLETTER	7	**DISTRIBUTION**	56
BUSINESS & INDUSTRY	11	**RESEARCH**	68
CW REPORT	35	**SPECIALTIES**	78
		MARKETS	89

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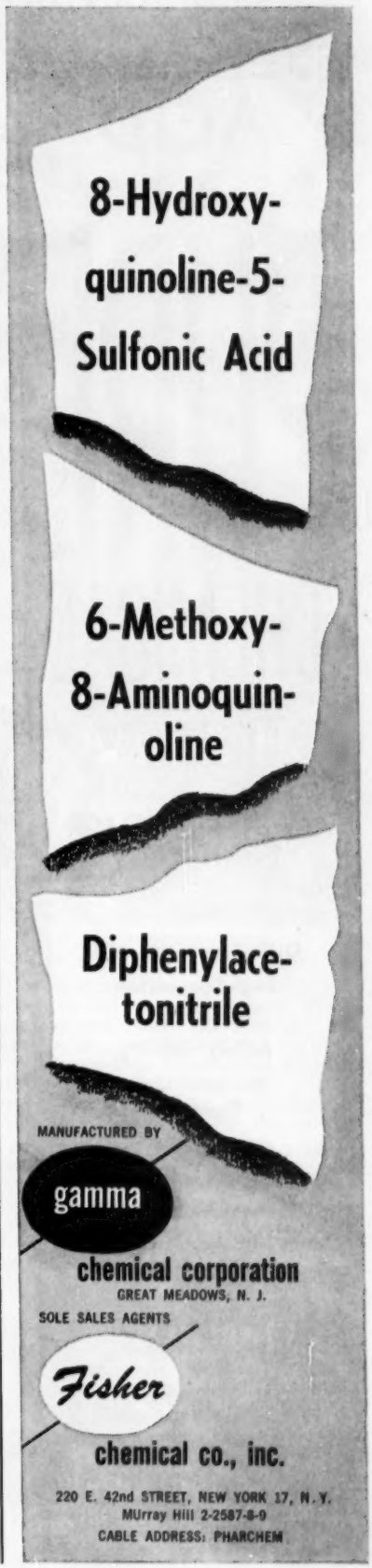

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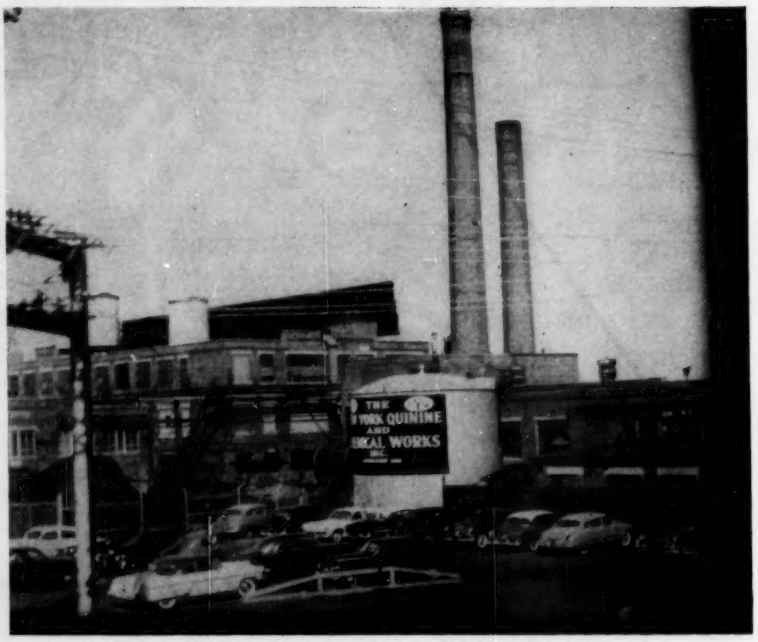

JERSEY'S NYQ: Nestling on the northbound.

Northbound Glimpse

TO THE EDITOR: . . . After reading your new article "Chemical Avenue, U.S.A.–90 Miles Long" (*Aug. 7*) . . . which pictures chemical plants along the Pennsylvania Railroad between New York and Philadelphia, I'm convinced that the writer and photographer took the southbound rather than the northbound train. . .

The reason for this sterling observation is that he overlooked the excellent new plant of New York Quinine and Chemical Works located on the northbound side of the tracks at the border of Newark and Elizabeth.

The omission of our fine firm–which has a history dating back into the mid-1800s–causes a personal pang only as I am not writing you on behalf of my company but on behalf of myself.

It is particularly distressing to see the names of many of our customers . . . while little NYQ hides behind the protection of northbound tracks. . . .

Just for that–we won't calm your next tummyache, soothe your fevered brow, relieve your aching head, or stop that rattling cough!!!

WILLIAM A. THAWLEY
General Sales Manager
New York Quinine and Chemical Works, Inc.
New York

So that we may be assured of being calmed, soothed, relieved, may we hasten to assert that we didn't overlook NYQ (see cut) *even though the photo was not published. Our photographer shot pictures (216 of them) on both the south- and northbound runs (from a specially arranged-for train). The NYQ photo, unfortunately, just got lost in the shuffle of the 216.*–ED.

Keep it Monosyllabic

TO THE EDITOR: It is surprising to find in two consecutive Newsletters (*June 26, July 3*) the awkward phrase "has come up with."

There are a number of verbs (produced, developed, perfected) that a magazine priding itself on its terseness could have used. It is true that research and development work is sometimes dark and murky, but that hardly justifies the use of a phrase that makes it sound like a diving operation.

MARCUS D. RODGERS
Berea, O.

Reader Rodgers has us coming up for

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: W. A. Jordan, Chemical Week, 330 W. 42nd St., New York 36, N. Y.

. . . . . .

air. We plead guilty to being overfond of a phrase, but we'll point out in its defense that it's composed entirely of terse monosyllables whereas Reader Rodgers' alternatives are uniformly and distressingly polysyllabic. —ED.

Bump Assuaged

To THE EDITOR: Perhaps my bump of curiosity is overdeveloped, but it always gripes me to see unidentified people in a picture. . . . I refer especially to the anonymous "U.S.-Belgian trio" on your Aug. 7 cover.

P. J. O'LEARY
Boston

Had we published the names on the cover, we wouldn't have had room for anything else; but we should have identified the men elsewhere. Let us assuage Reader O'Leary's curiosity bump herewith: left to right, Raymond Lavianne, managing director of Etudes et Recherches Industrielles, Brussels; Ralph Landau, executive vice-president of Scientific Design, New York; and Maurice Welsch, director of the plant.—ED.

DATES AHEAD

World Congress on Surface Active Agents, Sorbonne, Paris, France, Aug. 30-Sept. 3.

National Agricultural Chemicals Assn., annual meeting, Essex and Sussex hotel, Spring Lake, N.J., Sept. 8-10.

International Congress of Industrial Chemistry, Brussels, Belgium, Sept. 11-19.

American Institute of Chemical Engineers, national meeting, Colorado hotel, Glenwood Springs, Colo., Sept. 12-16.

American Chemical Society, national meeting, Statler hotel, New York, Sept. 12-17.

American Assn. of Textile Chemists and Colorists, national convention, Atlanta Biltmore hotel, Atlanta, Ga., Sept. 15-18.

Chemical Market Research Assn., fall resort meeting, Equinox House, Manchester, Vt., Sept. 20-21.

Drug Chemical and Allied Trades Section, N.Y. Board of Trade, annual meeting, Pocono Manor Inn, Pocono Manor, Pa. Sept. 23-25.

National Chemical Exposition, Chicago Coliseum, Chicago, Oct. 12-15.

National Safety Congress and Exposition, chemical section, Chicago, Oct. 18-21.

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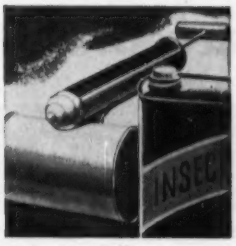

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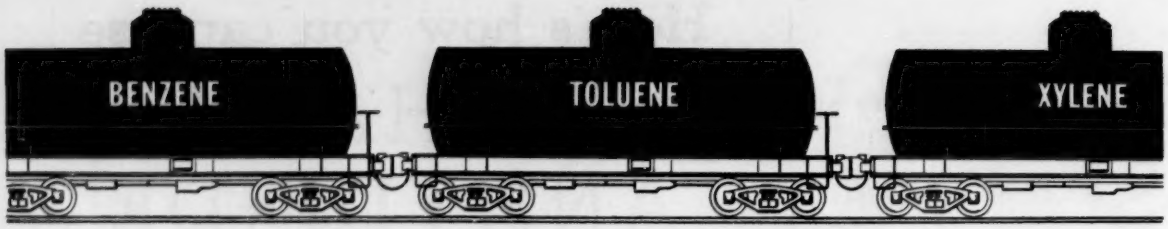

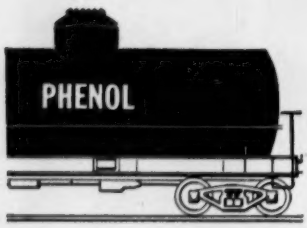

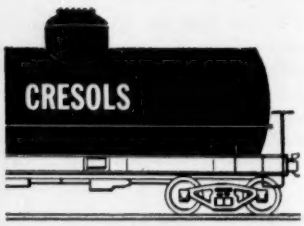

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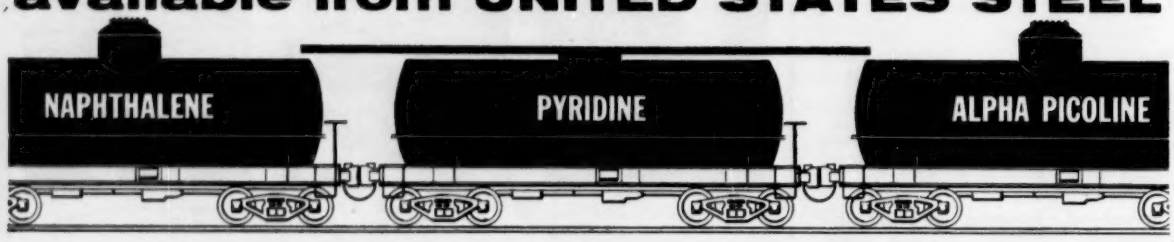

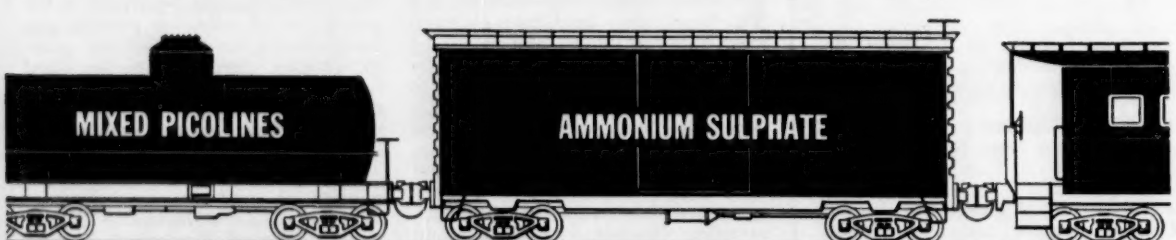

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Chemical Week
BUSINESS MAGAZINE OF THE CHEMICAL PROCESS INDUSTRIES

NEWSLETTER

Private industry has been invited by the Army to bid on construction of its first full-scale nuclear power plant suitable for supplying power to remote military bases. Invitations have gone out to 33 firms that the Army and AEC say are qualified. Among them: Vitro Corp., Blaw-Knox, Fluor, Walter Kidde, A. D. Little, Merritt-Chapman & Scott, Ralph M. Parsons, and Food Machinery and Chemical. (Some of these would submit joint bids with equipment manufacturers.)

Specifications call for the "package" plant to be so designed that no component will be too large to be transported in a cargo plane. To have a capacity of 1,700 kw., it will be designed around a "pressurized water" reactor—same type as in the atomic submarine and the Westinghouse-designed plant to be built near Pittsburgh. The reactor will heat water in a primary circuit to 450 F at 1,200 psi. The heat will be transferred to a secondary loop where steam is formed to turn the turbo-generator. The plant will be built at Fort Belvoir, Va., will cost about $4 million.

This marks the first time competitive proposals have been sought for development, engineering design, and construction of a power reactor. AEC has heretofore let contracts of this type for experimental facilities on a cost-plus-fixed-fee basis.

•

In another atomic sector, last weekend saw the settlement of a wage dispute involving 4,500 AFL workers at Oak Ridge. Workers voted to accept the 6¢/hour recommended by the President's labor relations panel —much to the consternation of the CIO, which hoped to hold out for 15¢ and whose workers were under a Taft-Hartley strike injunction.

Meanwhile, some 8,000 AFL construction workers at Oak Ridge were seeking travel pay—most of them live at Knoxville, some 15 miles away. A Presidential panel has taken up their demands.

•

Office of Defense Mobilization has officially confirmed what has been expected—that the third round of aluminum expansion would be abandoned (CW, Aug. 21, p. 93). Set up in Oct. 1952, it called for a 200,000-ton increase in domestic primary capacity over this year's 1.5 million tons.

ODM's explanation: a new look at aluminum supply/demand shows that anticipated supplies—boosted by Alcan's big Canadian expansion—will amply meet mobilization needs, that there's no justification for additional government incentives to spur domestic expansion.

Fast tax write-offs had been granted under the third-round plans to Harvey Aluminum, Olin Industries and Wheland. Only Harvey—with a 50,000-ton smelter planned for an Oregon site—was set to start; the others were waiting for government-guaranteed loans to help them along. ODM's market commitment to take Harvey's future production still stands if the firm decides to go ahead with its project.

•

But it's a different story on titanium. There's now a strong possibility that U.S. Steel will enter the field with a $30-million plant in the Boise, Idaho, area. Determining factor is the outcome of current negotiations with Defense Minerals Exploration Administration over the purchase contract. Ilmenite, titanium raw material, is being stockpiled in Boise in

anticipation of a successful outcome, and dredging leases on public and private lands are being revised to cover problems of royalty payments on extracted titanium ores.

•

Research is always in the chemical news, but this week is especially marked by a diversity of developments:

Stanford Research Institute is readying for distribution an 80-page summary of a 400-page report it prepared for Weyerhaeuser Timber on the future—through 1975—or forest products: lumber, pulp, paper, plywood, fiber products.

Climax Molybdenum will expand its laboratories in Detroit, will launch a research program on molybdenum chemicals—catalysts for upgrading low-octane gasolines, lubricants, new chemicals. Until now the major emphasis has been on metallurgy.

The four major rubber companies—Goodyear, Goodrich, Firestone and U. S. Rubber—are all looking hard at isocyanate foams (CW, July 17, p. 66). Goodyear already has a product, but one or more of the others will join battle with it soon. Problems: the patent situation, competition with their own rubber latex foams.

Monsanto Chemical's organic division got a 50% fast write-off on $447,750 for a research laboratory at Nitro, W. Va.

•

The ceramic segment of the chemical process industries is assessing the potentialities of a new ceramic veneer, 3/8 in. thick and weighing only 4 lbs./sq. ft. Intended by its manufacturer, Robinson Brick & Tile Co. (Denver), for interior and exterior walls, flooring, counter tops, etc., the new product may do for the structural clay industry "what plywood has done for the lumber business," thinks the company.

•

More petrochemicals coming: Sinclair Chemicals, Sinclair Oil's petrochemical arm, this week started construction of a unit to produce 18 million gas gal./year of toluene, xylenes, and para-xylene. A Udex unit will be built under license from Universal Oil Products and an additional installation will make 10 million lbs./year of para-xylene.

•

Here's solid evidence that the Chemical Corps chief, Major-Gen. William Case Creasy, is beefing up the Corp's technical strength: Next week Per K. Frolich, vice-president for research and development of Merck & Co., will take a top-echelon job with the Corps.

•

Back to Washington to reactivate his application for General Services Administration financing of his proposed titanium plant went M. G. Mastin, president of Aero Metals, Inc. (CW, Newsletter, July 24).

With him went a letter of intent from the Bureau of Reclamation to grant him a long-term lease on the Boulder City site he wants.

•

American Potash & Chemical's business has been as much real estate as chemicals the past six weeks. In that time it has sold 336 houses at Trona, Calif., to its employees. All the company retains of the formerly company-owned town are the business district and the "bachelor" quarters for unmarried workers. The company donated its street lights, fire-fighting equipment and other public service facilities to the San Bernardino County tax district that's now responsible for the area.

. . . The Editors

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What alcoholates will it make?	"Sodium Alcoholates"	☐
How does it react with ammonia to produce the amide?	"Sodium Amide"	☐
How many alloys are possible?	"Sodium Alloys"	☐
What uses can be made of the hydride?	"Sodium Hydride"	☐
What fatty alcohols will it produce?	"Fatty Alcohols for Industry"	☐
How can alkyl sodium compounds be used?	"Alkyl Sodium Compounds"	☐
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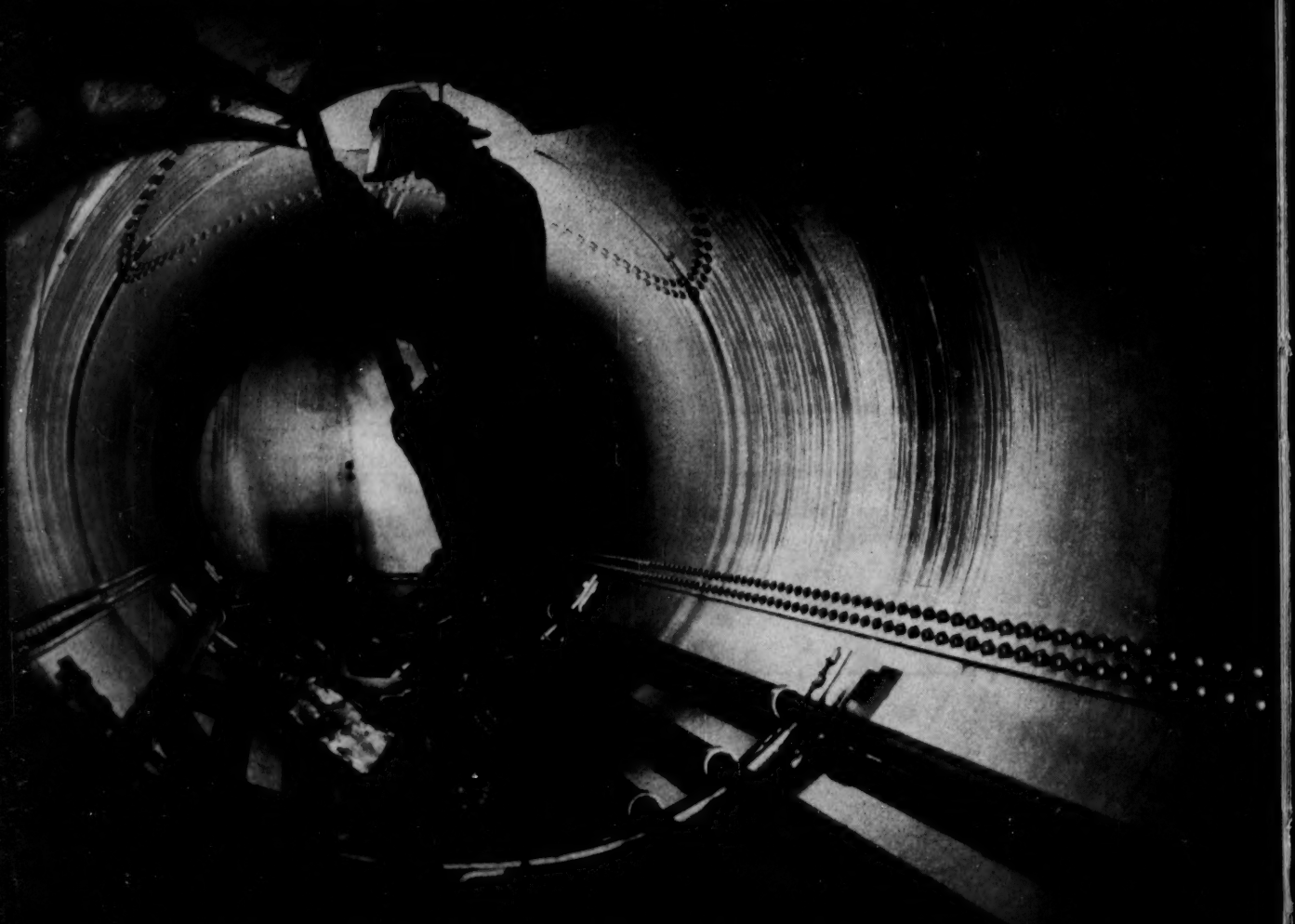

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Chemical Week

BUSINESS & INDUSTRY . . .

Better Break from FOA

U.S. nitrogenous fertilizer producers, who have long felt that foreign aid purchases favor non - American suppliers, are about to get a better break on future Foreign Operations Administration contracts. And although the plum's not as sweet as it has been in recent years (only 240,337 metric tons of fertilizer were purchased for foreign aid use in the 12 months ending April 30, '54), the prospect is still considered valuable enough to evoke spirited bidding among many U.S. firms.

In essence, four developments in Washington last week highlighted the late change in atmosphere:

• Congress passed and sent to the White House a bill requiring foreign bidders for FOA contracts to include cost of shipping half their product in U.S. bottoms. Previously, only U.S. companies have had to figure on such costs.

• FOA received a strong suggestion from the Senate Appropriations Committee that it should "adjust" bidding procedures so that U.S. firms can compete fairly.

• General Services Administration's Emergency Procurement Commissioner A. J. Walsh ordered that when fertilizer is bought on a negotiated-bid basis, the name and price of each bidder must be made public. Previously, it's reported, some fertilizer firms requesting such information have been turned down by FOA officials on the grounds that the bids were not open.

• FOA itself, as if in concession to last spring's meeting between FOA officials and fertilizer producers (*CW, March 6, p. 20*), is circulating a possible revision of its fertilizer procurement regulations for comment.

Not Without a Struggle: Few industry producers, however, think there's much chance that FOA will accede to their main request—that half the tonnage of each fertilizer purchase be reserved for U.S. bidding. Even without this proviso, they're grateful for whatever break they can get, feel that they'll now have a much better chance to do more business overseas.

But they may be reckoning without the weight of Sen. Harley Kilgore D., W. Va.). Spearhead of the move to effect radical changes in FOA's nitrogen- and coal-buying programs, Kilgore's main plaint has long been that U.S. companies are suffering a severe loss of business revenue because they're forced to ship half their goods in U.S. bottoms. And that, in Kilgore's book, just isn't sensible: "Fertilizer producers on the one hand are complaining that they're not getting enough business to keep going . . . some of them are having to lay off personnel. And on the other hand, they're denied fair competition from a U.S. agency. It just doesn't add up . . ."

WIDE WORLD

SENATOR KILGORE: Stumping for changes in FOA's fertilizer policy.

FOA chief Harold Stassen isn't convinced that the law's entirely at fault, however: "It would be very helpful if U.S. businessmen interested in fertilizer would try to explain their problem to the Merchant Marine in order to develop some degree of understanding. That would immeasurably help FOA to work out any current administrative problem."

Anticipating the Need

Paralleling the interim goal for titanium smelting facilities set last February, the Office of Defense Mobilization last week sets its sights on 37,500 tons of titanium processing facilities by the end of 1956. Certificates of necessity providing for amortization write-offs in five years (instead of the normal 25-year span) will be offered to any firm that can show that a supply of titanium ingot or raw material is available to it to fulfill its commitments.

Main reason for the concern over processing plants, ODM states, is the strain any sudden step-up in demand for titanium mill products would put on the steel milling industry. There are today, in the U.S., no processing facilties specifically designed for titanium; the industry has to rely on plants designed for stainless steel processing. Also, it's expected that both improved quality and reduced costs will accrue when producers use units especially designed for that work.

Like the titanium smelting goal, the new processing goal is still considered "interim" in character by ODM officials . . . at least until the review (now under way) of U.S. material requirements in event of a future mobilization has been completed. Then it's quite likely that the entire titanium picture will be reviewed, and firm new goals will be established—not only for processing and ingot-melting, but also for sponge-making facilities.

Sales in Suspense

A big, black question-mark of uncertainty hangs over petrochemical and other industrial manufacturing projects involving use of natural gas as fuel or feedstock in the Northern states.

Reason: contracts for sale of natural gas to the cross-country pipeline companies now may be called off because of the U.S. Supreme Court ruling that wholesaling of natural gas by independent producers for interstate use is subject to price regulation by the Federal Power Commission (*CW, June 19, p. 40*).

All the months and years that the Phillips case was before the FPC and the courts, lawyers for that company had been warning that such a decision might pinch off the northward flow of natural gas. This week, producers are making up their minds on whether to accept FPC price controls or to refrain from doing business with interstate pipeline concerns.

May Use 'Outs': First test of what large producers plan to do will come in the case of American Louisiana Pipeline Co., which has applied for permission to construct and operate a new 500-million cu. ft./day pipeline from

the Southwest to Michigan and Wisconsin.

Gulf Refining Co. and Humble Oil & Refining have contracts to supply large amounts of gas to American Louisiana if that application is approved. But written into each of those contracts was a clause permitting cancellation in the event that the Supreme Court recognized FPC pricing jurisdiction. After the Supreme Court did that very thing, FPC ordered prices frozen as of last June 7, and decreed that independent producers planning to sell gas for interstate piping must apply for certificates of convenience and necessity by Oct. 1.

The four other companies that have contracted to sell gas to American Louisiana don't have that same escape clause in their contracts.

Latest attacks on the FPC "freeze" order came from Congress—which has refused to allot money to finance the agency's new policing chores—and from Continental Oil Co., which terms the order "invalid."

Meanwhile, Seattle Gas Co. has signed a $100-million, 20-year contract with Pacific Northwest Pipeline Corp., which has FPC permission to pipe natural gas from New Mexico to Puget Sound. However, delivery may be delayed by a lawsuit that a Canadian company says it will file in a last-ditch fight to get FPC to reverse its stand on Pacific Northwest.

One More Proposal

There's a new wrinkle in the French plan to produce synthetic rubber this week—but for once the proposal isn't tied in with any move to bail out the shaky industrial alcohol industry.

Latest idea — submitted to the French government by a group of oil, chemical and tire companies including Esso Standard, Michelin, Dunlop, Kleber-Colombes, Kuhlmann, Rhone-Poulenc, Pechiney and Ugine—calls for the construction of a plant in Normandy designed to turn out (in the initial stage) 20,000 tons of butyl rubber annually. As now planned, the unit would employ isobutylene exclusively as its raw material; alcohol would be discarded—as "potentially" too expensive.

"That proposition, however," states one French alcohol executive, "in no way precludes the possibility of a rubber-from-alcohol plant being built either in France or elsewhere on the Continent" to soak up excess industrial alcohol output. "That's still very much within the realm of possibility . . . is being considered by a handful of companies."

BURKE & DEAN

CHEMICAL UNION'S COMBATANTS*: After 10 years' invincibility, Bradley bows.

Outer Calm, Inner Clamor

Tools are being sharpened for a big renovating job within the International Chemical Workers Union (AFL), biggest labor union in the chemical industry of the U.S. and Canada; but while the new regime (CW Newsletter, Aug. 21) is bent on revamping the union's internal structure, incoming officers are planning little or no change in ICWU's external relations with chemical management.

President-elect Edward R. Moffett—who's scheduled to take office next Jan. 1—is regarded as being as much of a "conservative" or "right-wing" unionist as the incumbent, Herbert A. Bradley. He's proud of the fact that during the 14 years he has led AFL chemical workers in the Southwest, there have been only two strikes by his followers—both against salt companies at New Iberia, La.

So from all present indications, chemical firms that have contracts with ICWU locals can expect continuation of such present policies as:

- Extensive use of economic research and education as principal means of gaining wage increases to keep up with other parts of the economy. ICWU will try to get the best terms in the chemical industry, but won't try to be an all-industry pace-setter like the CIO Steelworkers.
- Strikes to be shunned if at all possible; "wildcat" strikes outlawed.
- Companywide, multiplant bargaining to be used when possible and profitable; no attempt within foreseeable future for industrywide bargaining.
- Short-term contracts to be preferred; no pressure yet for guaranteed annual wage.
- Denial of membership to "Communists, Fascists, and Bundists."

Texas Lawyer: Moffet—a 60-year-old, soft-spoken Southerner who holds a law degree from the Houston Law School—has been first vice-president of ICWU since it was founded 10 years ago.

His advancement to the presidency comes as a result of the dissatisfaction that mounted against Bradley during the latter's 10 years in the top post. This dissatisfaction started with more or less personal grievances; for example, John Gratz—who'll now return to his former position as vice-president for the St. Louis district—took exception to Bradley's ruling that Mrs. Gratz, a clerical worker in ICWU's Monsanto local No. 81, was not eligible for membership because she wasn't working for Monsanto.

Such dissatisfaction had been building up gradually, and each year's convention brought more criticism of Bradley and more resolutions for limiting the president's powers. But up to this year, Bradley won out every time because he had the backing of other officers.

* Left to right, anti-Bradley vice-presidents Mitchell, Lewis, McClure; secretary-treasurer Shafer; behind Shafer, vice-pres. McIlwain; in rostrum, a tired, embittered Bradley.

BURKE & DEAN

OPPOSITION'S GARFIELD: In long opening speech, he hurls "tyranny" charge.

CECIL THOMPSON STUDIOS

PRESIDENT-ELECT MOFFETT: In chemical labor, continued conservatism.

Veeps' Revolt: This past year, however, saw an open break between Bradley and most members of the union's executive board. They were annoyed at Bradley's direct supervision of affairs within their own districts; they called it "one-man rule."

Their displeasure erupted into abrupt action last fall when Bradley suffered a heart attack. Board members felt that Bradley had tried to conceal from them the fact that he was hospitalized and that he had tried to make his private secretary the kingpin in the organization during his absence.

Board members got together in union headquarters at Akron, O., declared the presidency vacant, and installed Moffett as acting president. When Bradley recovered his health, he was allowed to take office again; but tension between the pro- and anti-Bradley forces increased right up to this month's convention in Chicago.

"Tyranny" Charge: Extra policemen stood by in the Windy City's Morrison hotel as Vice-president Sidney Garfield of the Chicago district —hence, host to the assembly—opened that hurly-burly convention with a long speech lambasting Bradley as "a union dictator."

For four days, turmoil reigned while the 550 delegates debated the charges and countercharges.

At last came a crucial development on hot, humid, Friday the 13th. The credentials committee recommended seating of Bradley-appointed delegates from two locals under Bradley's personal supervision; the opposition, headed by Garfield, demanded recognition of delegates elected by those locals. The issue had to be decided by the whole convention. On a voice vote, the "ayes" and "nays" resounded with equal volume; on the decisive roll-call vote, 558 votes were recorded for the elected delegates and 543 for seating the delegates chosen by Bradley. This assured the anti-Bradley faction of the 25 votes from those two locals, set the stage for the 578 to 536 vote for Moffett.

Marshall Shafer, who played a leading role in the anti-Bradley movement, was re-elected secretary-treasurer. All regional vice-presidents were re-elected except Moffett, who was upped to president, and Mrs. Nona Fry of Memphis, a Bradley loyalist, who lost out to Gratz. A. Vincent Busby of Newark—the first staff member appointed when the union was chartered 10 years ago, and who remained faithful to Bradley throughout the battle—was re-elected, but was demoted from fourth to ninth in precedence. Newcomer to the executive board is Preston Delcambre, former president of local No. 28 at New Iberia, who'll succeed Moffett as vice-president for the Southwestern region. Senior vice-president will be Joseph Donovan of Marshfield, Mass.

Moffett comes into his new leadership role with friendly words for chemical management: "I have a high opinion of our industry's labor relations," he told CW. "I think our union generally has good relations with management, and where they're not so good, I hope they can be improved."

Balm for the British

In what may signal a general policy shift in the sale of strategic materials to Communist countries in Europe, representatives of the 16-nation Allied watchdog committee in London last week dropped 80 more items from its "control list." Sale of arms, airplanes, uranium and a number of chemicals is still strictly forbidden, but observers close to the scene predict further easing in the very near future.

The move, decided on last month after British-American talks in Washington (and later approved by the 14 other Allied countries, which include all the North Atlantic Allies, West Germany and Japan), immediately benefits a number of British firms said to hold $14 million worth of tentative contracts with the Soviets. West German officials are openly jubilant, too, are calling for an immediate expansion of West German-Russian trade.

Other member nations are more cautious in their reaction. "Nothing's really changed," states a Paris statesman. "The Allied watch on East-West trade will still be under the jurisdiction of three control lists, (one listing items forbidden for sale, the second containing materials subject to quantitative restriction, the third naming items designated for 'close scrutiny')."

If it becomes apparent that the Communists are stockpiling a particular material, or buying more than their peacetime needs, it's a sure bet that tighter embargoes will be imposed again.

Certificate Checkup

Government statisticians went into a huddle last week, came up with a new set of figures on how the chemical industry has expanded since 1950, thanks to the Office of Defense Mobilization's fast tax write-off program.

Out of a total $2.9 billion worth of write-offs granted to chemical companies, the industry has gone ahead with projects valued at $2.7 billion. Over $2.3 billion had actually been spent through March '54—$1.1 billion of it representing work done on complete plants.

These figures, in effect, provide a pretty accurate picture of chemical expansion planned during the Korean mobilization period—since almost all chemical companies have been eligible for the welcome quick write-off in recent years. Major exceptions: acrylic and polyester synthetic fiber expansion, and some polyethylene capacity.

Taking the honor as having come closest to finishing its expansion commitments is the alkali and chlorine

sector of the chemical industry. It's estimated by ODM that 99.6% of the value of all chlor-alkali facilities granted fast amortization rights will be in place by next month.

In such other classifications as industrial inorganics, organics, synthetic fibers, and compressed and liquefied gases, the value in place on projects that have been started ranges from 93-98%.

Plastic materials expansion is the slowest in getting under way: percentage completed is only 71%. Significantly, however, (except for the alkaline-chlorine category), projects not started account for a mere 2.5% of the total amount authorized for plastics facilities.

EXPANSION . . .

Ammonium Phosphate: Brea Chemicals, Inc. has started building its latest ammonium phosphate units at Brea, Calif. Company officials say they expect to have similar plants in operation at Brawley and Fresno, Calif., early next year.

•

Paint, Varnish: Canadian Industries Ltd.'s Paint and Varnish Div. will enlarge its Toronto facilities to the tune of $1 million. Part of a longer-range expansion program, the new single-story extension will double present warehouse capacity and increase research and development facilities.

•

Sulfuric Acid: Eagle-Picher Co.'s 300-ton/day sulfuric acid unit at Galena, Kans., was started up last week. The unit utilizes sulfur dioxide gas produced by the roasting of zinc ores; most of the resultant sulfuric acid will be sold for conversion into phosphate fertilizer.

•

Ammonia: Initial operations are under way at Sherritt Gordon Mines, Ltd's $24-million chemical-metallurgical plant at Ft. Saskatchewan, Alta. Located 18 miles northeast of Edmonton, the plant is turning out 75 tons of ammonia per day, substantial amounts of ammonium sulfate and primary nickel. Cobalt units are next scheduled for completion.

COMPANIES . . . .

B. F. Goodrich Co. has taken over control of Sponge Rubber Products Co., Shelton, Conn., in a deal involving close to $2 million. The operation will be run henceforth as a Goodrich Division.

•

More company first-half earnings:

- Victor Chemical Works, Chicago registered a 19.7% jump in net earnings—from $1.6 million for the half year ending June 30, 1953 to $1.9 million this year.
- Pennsylvania Salt Manufacturing Co. saw sales fall off 1.8%—from $29.8 million to $29.2 million—and net profits drop 5.8%—from $1.8 million to $1.7 million.

•

Dow Chemical Co. has formed a new associate company to manufacture Styron (its polystryene plastic) in the British Isles. The company, incorporated as Distrene Ltd., is jointly owned by Dow and The Distillers Co., Ltd., Edinburgh, Scotland, the U.S. company holding a 45% interest. Production is expected to start in early 1955.

•

United Dye & Chemical Corp., which last week acquired the Central Standard Insurance Co. "to further diversify its activities" (*CW, Aug. 21, p. 18*) is reopening and extending its exchange offer of one share of preferred stock and one-fifth share of common stock for one 20-year, $100, 6% debenture. Expiration date for the new offer: Oct. 29, 1954.

•

Allied Chemical & Dye Corp. has acquired all of the outstanding stock of Mutual Chemical Co. of America, following an agreement between the companies, reported early in June. Current plans contemplate no change in Mutual's operation policies.

•

The manufacturing plant of The Lanpar Co. (one of the largest ethical pharmaceutical manufacturers in the Southwest) has been moved to Dallas and is now in operation. Plant capacity: 2 million tablets/day.

•

Tongin Fertilizer Co., of Marianna, Ark., has been granted a charter of incorporation in Little Rock. Authorized capital listed: $30,000.

'Long Bunch of Work'

PRESIDENT EISENHOWER and a group of Senate and House representatives were wreathed in smiles last week as the big new tax revision bill was signed into law. Chemical companies, however, were somewhat less exuberant. Reason: though Congress' "long, long bunch of work" (Eisenhower's words) is ended, there's heavy plodding ahead for corporate treasurers faced with a raft of rules needing further clarification prior to next year's tax deadline.

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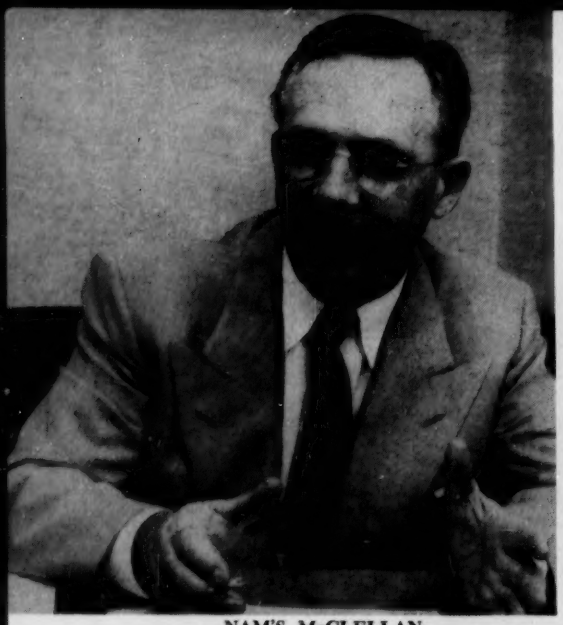
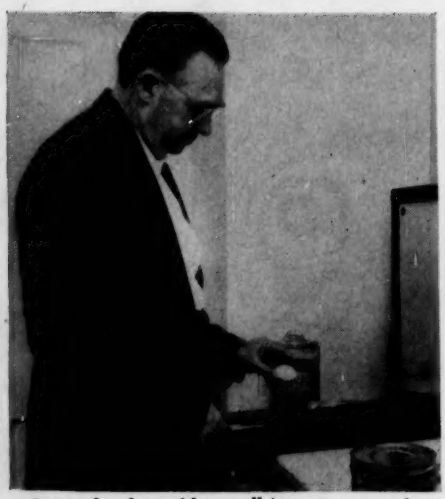


NAM'S McCLELLAN: . . .



Starts the day with an all-important two hours of solitude at home . . .

Greets Pacific Southwest Regional Manager Phil Holle.

No Substitute for Action

When Demosthenes was asked what was the first, the second, and the third part of oratory, his answer was the same in each case: action. No man—howsoever dedicated—can get his thoughts across to others if his own actions do not mirror his words.

Thus it's only natural that this year's president of the National Assn. of Manufacturers, Harold C. McClellan, has merited the attention of chemical men everywhere. Some may not agree with his views on industry's responsibility to society; some may differ with his pungent thoughts on public relations, but all accord him the compliment of living out his ideas—however unorthodox they may seem to be.

Keeping pace with the persistent, hard-driving McClellan is no mean task. During his term as NAM's president (tenure runs from Dec. 4, '53 to Dec. 3, '54), he has spent little time in Los Angeles handling affairs at his own company, Old Colony Paint and Chemical; most of the time he has been on the road—crossing and criss-crossing the U.S., encouraging executives to don the mantle of responsibility to country, state and industry alike. Between these excursions have been trips to Washington (for talks with Eisenhower, Nixon and Dulles) and a trip to Paris to attend the Second International Conference of Manufacturers.

Basic Tenet: Cornerstone of all

Works on speechmaking with assistant Lawson . . . attends Merchants and Manufacturing Assn. luncheon in Los Angeles . . .

interviews first of several NAM scholarship candidates . . . arrives at Tishman Building headquarters.

McClellan's thinking is his idea of man's responsibility to society. "If a guy's going to be critical, he should be willing to take some responsibility, too," he points out. "No one can afford to sit back and throw rocks; there's too much to be done if we're going to ride out our present emergency and cash in or our potential."

Three areas in particular, according to McClellan, need special work by competent chemical men everywhere.

• First is an across-the-board job of delineating for the public the true picture of our private enterprise system in the U.S. today. "We've done a good job of marketing our products . . . a terrible job of marketing our economic way of life." If people are clear about the good—what our competitive system has done for each and every one of us—they'll be sympathetic about the bad, and see the problems management faces as something that can be worked out *within the system.* Further: the only sensible place for any executive to start his information campaign is at home—in his own plant. "If employees working for me don't understand the basic economics of our own company, how can they understand the complicated and huge problems of industry as a whole?"

• Second is the "regrettable lack of understanding between industry representatives and educators—at all levels—and equally bad on both sides." One big misunderstanding, according to McClellan, of the average businessman is that "education should be indoctrination. We must never fall into the trap of thinking our concepts are beyond question . . . never be afraid to examine other systems honestly and let the chips fall where they may."

A large portion of the lack of understanding derives from faulty communication . . . lack of "getting in on the act" with schools at all levels. McClellan himself has served on an advisory committee on industrial relations at the University of California, and for three years has been president of the Board of Trustees of Occidental College (in Eagle Rock, a Los Angeles suburb). He points with pride to the fact that during that period, Occidental has expanded, has become integrated with the community, has lost much of its antibusiness bias.

• Third, McClellan bemoans the fact that industry has "too often re-

Checks in at Old Colony Paint and Chemical . . . looks over batch tubs with chief color-matcher Thomas.

Story begins on p. 16

Talks over economics with hourly employees . . . gets briefed by Old Colony executives who run affairs in his absence.

neged on its responsibility in governmental matters on all levels—local, state and national." Why does he bemoan it? The reason's basically a selfish one—they just can't afford to let the chance slip by. Enlightened officials mean better business . . . a sounder economic system.

Everyone Takes Part: McClellan's concept of industrial relations ties in with his belief in communication—if everyone understands everyone, everyone will work together. Ot Old Colony, he holds periodic meetings with his employees, invites small groups (15-25) into his office to talk over his own activities, the status of the company, its successes and problems.

Quite matter-of-factly he encourages comment and discussion, quizzes workers on their gripes, "lays everything out on the table." New employees are requested to fill out unsigned questionnaires on company profits in terms of sales—what's fair, what they consider a good return on investment. Then McClellan himself gets out the books, figures out actual percentages, explains what management would like. In most cases, employees' estimates are way above actual figures—on both what's earned and what they think should be earned. Often the difference is three or four times as much as the actual amount—"a real eye-opener for everyone concerned."

Another approach illustrating how he thinks management can further harmonious labor relations was taken at Old Colony several years ago, is still bearing fruit. A group of supervisors asked McClellan for his o.k. on a Supervisors' Club. He said yes, provided that it would include everyone with any supervisory duties, that it be democratic and free of company control, that it pay its "own freight," and that for the first year it not discuss problems related to the company.

Takes a quick hop to NAM meeting to report on state of European industry . . . and what it means to U.S. producers . . .

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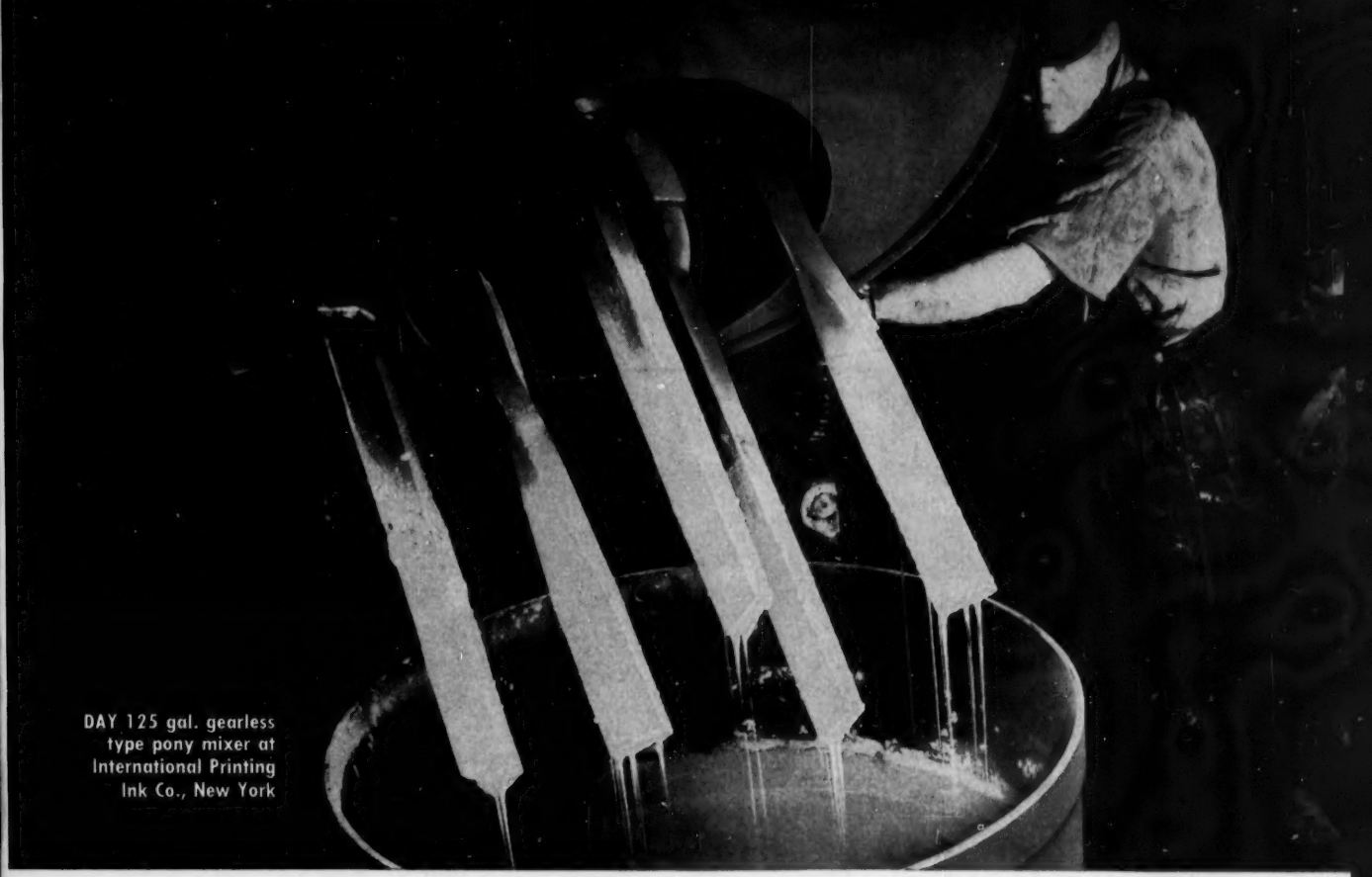

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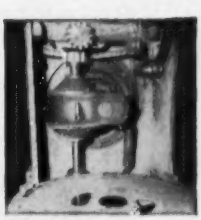

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Story begins on p. 16

Arrives home after a hectic, appointment-jammed day to . . .

There were discouragements at first, McClellan recollects, but in time the club got going, invited speakers to address it, visited other plants. After a year, things were operating so smoothly that he lifted the ban on discussions related to the company; members (of which he himself is one) talked over anything they pleased from individual problems to over-all operating policy.

But it was when a big management decision was called for that the Supervisors' Club really proved its merit. Company executives found themselves faced with the problem of expanding their plant market beyond the Los Angeles area. But cost (with freight charges tacked on) was a limiting factor. What to do?

McClellan decided to toss the problem into the hands of the management club. They kicked it around in informal sessions, decided that paring material costs was out ("it couldn't be done without sacrificing quality"), Old Colony's advertising budget couldn't take major trimming, and so on. The only answer, they agreed, was greater output per man.

How to get it? The first suggestion was that all supervisors crack down, make the employees work harder. Then one member rose, asked, "Are we good foremen? Do the men understand what they're doing? Do we have good lighting? Have we set up our job operations in the easiest, most efficient way?" The only thing to do, it was decided, was for each supervisor to talk things over with his workers, get their opinions on the problem. Result: without putting pressure on individuals, just "by looking for better ways of doing things," production was increased by more than a 0.5 million gal./year—with no more workers.

Value of Profit-Sharing: Asked whether he believes in profit-sharing (as he was asked on *Meet the Press* recently), McClellan insists it's necessary to define what you mean by it: "Workers shouldn't get capital's money nor vice versa." At Old Colony there's

. . . relax in an after-dinner stroll in his camellia gardens . . .

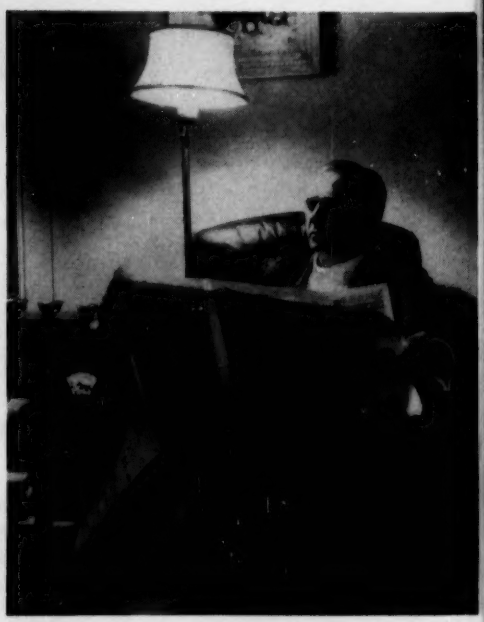
a bonus system for supervision, no bonuses for hourly workers, no union. "I tell them to get a union when they think they need one . . . but not until then. I tell them it's their choice, and if they go union, I'll do my part in making it work."

Employers, McClellan maintains, have a basic responsibility when there's bad union leadership. "The average guy in the plant wants to do the right thing. Major reason for the unreasonableness of some labor leaders is that they're under pressure to deliver something. If the employees—the union rank and file—are enlightened on the facts of business life, the pressure will be more reasonable."

Finally, on the all-important subject of communications, McClellan has a few last words. He points to his experience last December in Italy; as a member of the Foreign Operations Administration team, he attended a meeting with industrialists to mull over a common problem. After the get-together, some of the Italians told him it was the first time they had sat down with competitors to exchange ideas.

One of the likely spots where a chemical man can discharge his industrial responsibilities, of course, is within his trade organizations—first on a local level, then on a wider plane. McClellan himself has been active in association work ever since graduating from college, takes a special interest in their public relations "which should stick to principles and issues, not attack individuals."

Tough but Rewarding: Far from exhausted from this rigorous, self-appointed schedule, McClellan looks back upon the first nine months of his year as president of NAM with deep satisfaction. "I knew it would be a tough year," he admits, "but I didn't realize the greatness of the personal rewards—the great opportunities to see more and understand more about everything. If anything, the experience has deepened my thinking, has given a new and fuller meaning to my thoughts on the responsibility every man owes the industry and society of which he's a vital part."



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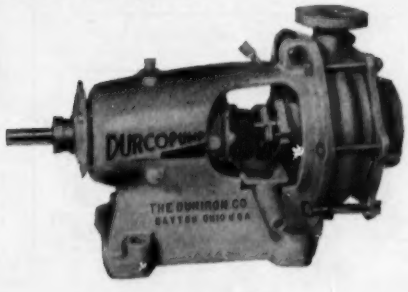
Durcopumps handle the severely corrosive tin plating solutions at Weirton. These DuPont halogen solutions with low pH and containing fluorides are continuously circulated from collecting tanks to plating trays by Durimet 20 Durcopumps, which are completely insulated from stray currents. Weirton also uses Durco transfer pumps, filter pumps and sludge pumps.

Weirton Steel Company, division of National Steel Corporation, operates the world's largest single tin mill. The strip on the lines moves as fast as 2000 feet per minute. An example of Weirton thoroughness is the ability to plate a different thickness on each side of the strip to best meet customer requirements.

Durco products have been the answer to thousands of tough chemical service problems. Maybe we can solve yours. Write for Catalog 54 or call the Durco engineer in your area.



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WIDE WORLD

'NO STRIKE' ORDER OBEYED*: At President's request, a keep-working dictum.

LABOR . . . . . .

Obedient but Resentful: Production work will continue at the Oak Ridge and Paducah plants operated for the Atomic Energy Commission by Union Carbide's Carbide and Carbon Chemicals Co.; but the United Gas, Coke & Chemical Workers (CIO)—representing about 4,500 employees in the two plants—can't be said to be very happy about the situation.

For one thing, the atomic workers still want more than the 6¢/hour wage increase recommended by the Atomic Energy Labor-Management Relations Panel. Also, they bitterly resent published criticism to the effect that their position is un-American, or any less responsible than that of the AFL workers at the same two plants.

Gas-Coke maintains that an orderly strike would not damage the uranium processing equipment, and that a strike seems to be the only way of getting benefits to which the workers feel they're entitled. It lambastes the daily press for what it calls "hidden-knife journalism," and particularly takes exception to a Boston newspaper's insinuation that the strike vote might have been inspired by "Reds" in the union. Present wage rates range from $1.58 to $2.40/hour.

* Accepting the temporary restraining order is Elwood Hain, CIO district representative at Knoxville; standing at right, Asst. Attorney General Warren Burger, who sought the injunction for the government.

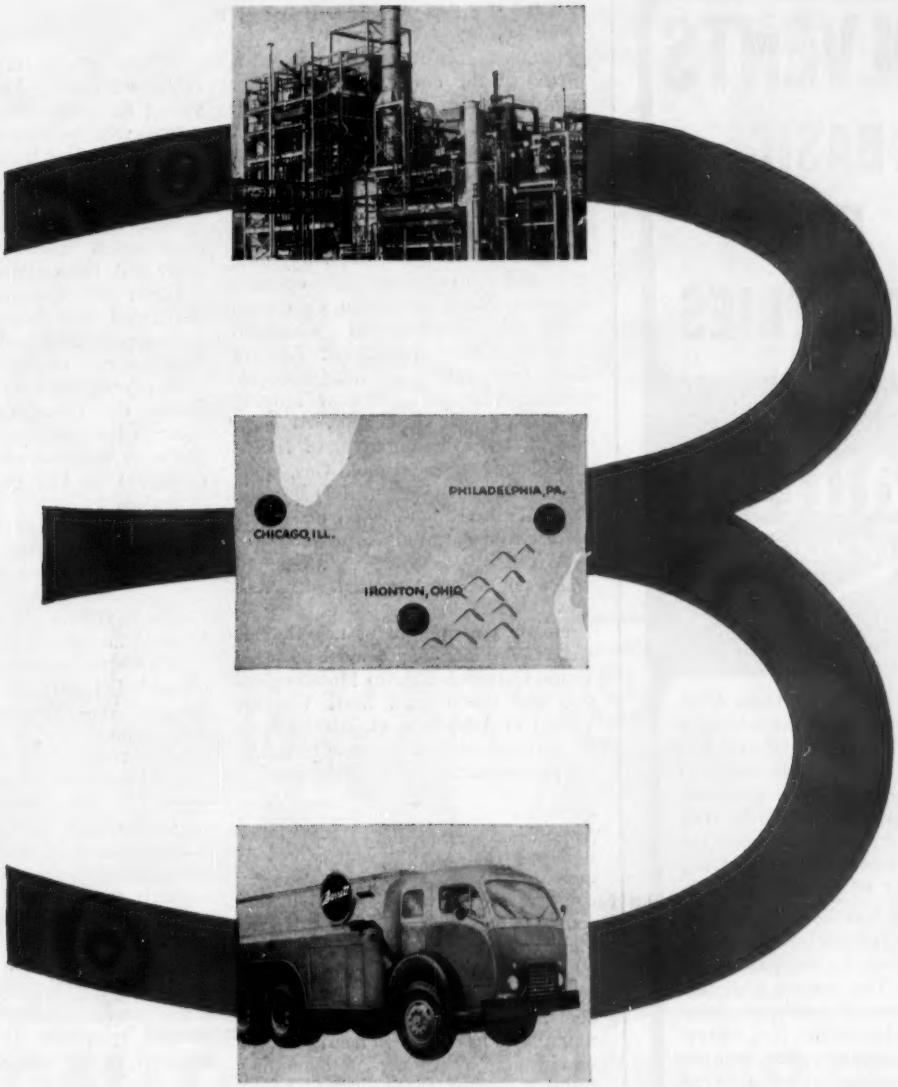
Strike Stretches Out: Also in striking mood are members of the United Rubber Workers (CIO), whose strike against Goodyear now has stretched out into its seventh week and who now have pulled out of eight Firestone plants. URW is trying to break the present pattern for 5¢/hour wage increases and get package boosts of about 7½¢.

The union has appealed to its working members to contribute $2/week apiece for living expenses of strikers and their families.

•

Salaried Employees: Cheer and chagrin are expressed this week by the Engineers & Scientists of America, the organization that seeks to unionize professional employees in large manufacturing industries. ESA is happy about the recent election held by the National Labor Relations Board at the Federal Cartridge Co. works in New Brighton, Minn., where engineers and chemists voted by 47 to 26 for continued representation by their ESA-affiliated union.

But ESA is displeased about the wage-hour administrator's new ruling on the Fair Labor Standards Act clause that exempts professional employees from the general requirement that extra pay be awarded for overtime work. Under the new interpretation, a draftsman or laboratory assistant earning at least $75/week is exempted from the overtime pay re-



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quirement, even if his salary status is such that the employer may deduct from his pay for absences (for personal reasons) of a day or more.

•

Lengthy Parleys: Two recently signed chemical labor contracts are the result of particularly lengthy negotiations. More than four months of bargaining preceded signing of the new contract between North American Cyanamid and the International Chemical Workers Union (AFL) at Niagara Falls, Ont., calling for a 3¢/hour increase on wage rates now ranging from $1.50 to $1.96/hour. At Bayway, N. J., representatives of Reichhold Chemical and United Gas, Coke & Chemical Workers (CIO) ground through three months and one week of discussions leading to a new two-year pact that provides for a 5¢ general wage increase. Average wage rate now is $2.08/hour.

Nearly two months of negotiations went into the new agreement between Union Carbide's Electro Metallurgical Co. and the United Steel Workers (CIO) at Ashtabula, O. It calls for a 5¢ across-the-board increase plus 1½¢ for job inequities.

•

Mousetraps Needed: With labor unions prodding state legislatures to increase benefits under the workmen's compensation laws, plant managers should note that state boards administering those laws are constantly taking a broader, more inclusive view of employer responsibility for accidents. It's reported that the Michigan commission has awarded nearly $3,200 to a woman as compensation for disability resulting from her being frightened by a mouse while at work.

Now It's 1,000

Undismayed by occasional setbacks like San Diego's voters' decision to end water fluoridation in their city (CW, June 19, p. 26) and by the incessant opposition of certain dedicated foes, the American Dental Assn. and public health agencies are gaining ground in their campaign for fluoridation of community water supplies.

Last week, the Kansas town of Osawotamie became the 1,000th U.S. community to start fluoridation, bringing to more than 20 million the number of persons in the U.S. who now are drinking fluoridated water (*CW Newsletter, Aug. 14*). This week, the profluoridation forces are starting to work on their second 1,000 communities, and Cleveland (pop. nearly 1 million) might be an early "convert."

Several years ago, the Cleveland city council enacted an ordinance providing for water fluoridation; but no action was taken to put that ordinance into effect because a taxpayer's suit was filed to prevent it. Now that the state court of appeals has ruled against that dissident taxpayer, the city's board of control may start to carry out the ordinance.

Court of Appeals Judge Joseph Artl ruled that fluoridation does not violate pure food and drug laws, and that the city council has the power to require water fluoridation. William Kraus, the Cleveland resident who brought the suit, says he'll appeal to the state supreme court and—if necessary—to the U.S. Supreme Court.

Besides Judge Artl's decision, further support for the profluoridation faction has come from the Oklahoma state supreme court (*CW, July 10, p. 30*), the Commission on Chronic Illness, and the County Medical Society at Colorado Springs.

The Commission on Chronic Illness —founded jointly by the American Hospital Assn., the American Medical Assn., and the American Public Health Assn.—concludes that if there is any health risk in use of fluoridated water, "it is so minimal and inconspicuous that it has not been revealed in many years of investigation." And the physicians at Colorado Springs —where the water supply naturally contains more than twice the amount of fluorides added in standard fluoridation programs—have passed a resolution notifying the dental profession that "we have not experienced any clinical symptoms that can be attributed to the use of such water."

LEGAL . . . . . .

Omission and Suggestion: What you say and what you fail to say on your package labels can be a pretty important thing. Latest instances:

• In U.S. District Court at Dayton, O., the federal government is seeking an order for destruction of 14 vials of a solution said to be intended for use as an injection in treatment of pituitary deficiency. The Food & Drug Administration charges that the article is misbranded in that its label fails to provide directions for use.

• At Washington, a Federal Trade Commission hearing examiner has ordered a New York and New Jersey firm to stop "suggesting" that its oleomargarine is a dairy product. The order prohibits the use of such terms as "churned to delicate, sweet creamy goodness."

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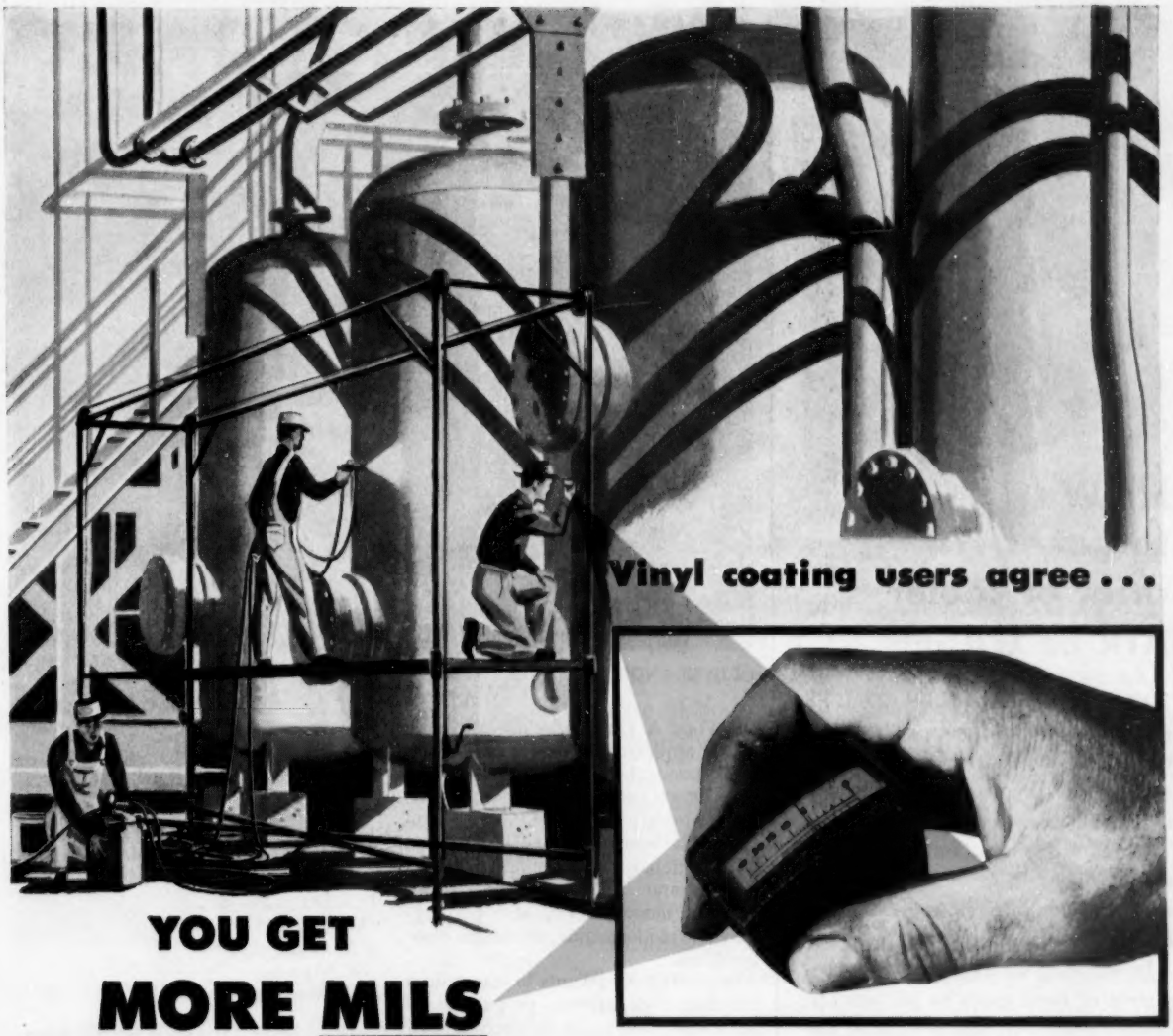
Additive Applications: Pending before



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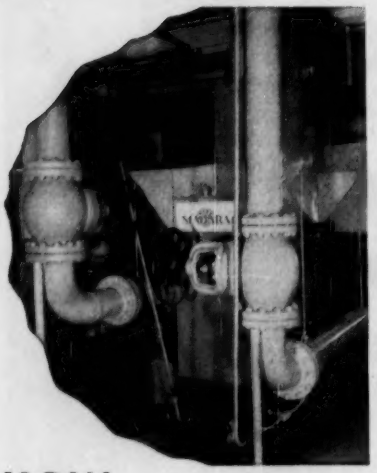
Write today for the AMERCOAT 33 Technical Bulletin which gives a complete description of the coating's chemical and physical properties.



HOW to get drier or cooler AIR or GASES

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If you use compressed air to operate instruments or pneumatic equipment you will get better results by using the Niagara Aero After Cooler.

Write for Bulletin 98, or ask nearest Niagara Engineer if you have a problem involving the industrial use of air. *Address Dept. CW.*

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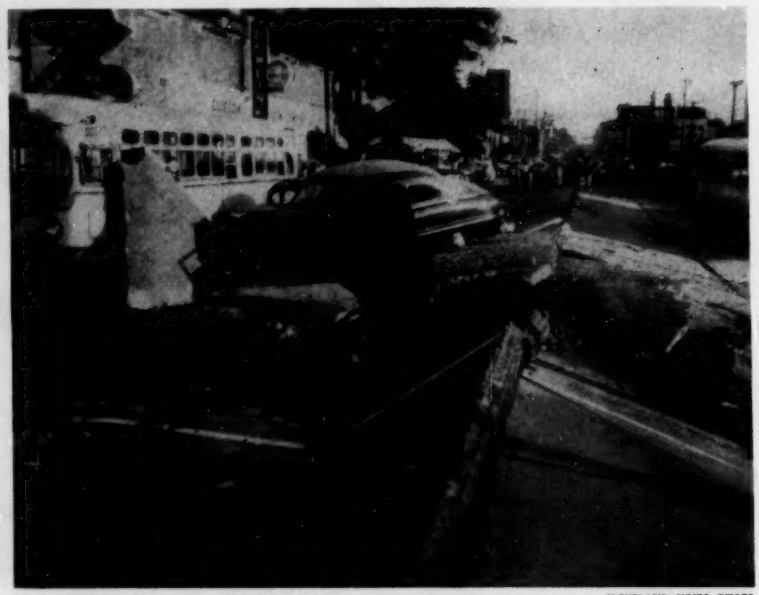

CLEVELAND NEWS PHOTO

CLEVELAND'S WEST 117 ST.: Following explosion in sewers, more lawsuits.

the Food & Drug Administration are these applications for clearance on new chemical additives in foods:

- Dow Corning Corp. asks that the list of approved additives for fruit preserves be amended to include these four optional ingredients: dimethylpolysiloxane fluid, colloidal silica, glyceryl monostearate, and polyoxyethylene monostearate, in various combinations.
- Swift & Co. wants to use sodium propionate or calcium propionate as an antimycotic agent in cheeses, and Best Foods, Inc., is expected to apply for approval of sorbic acid in cheese.

•

Process Firms Sued: Another lawsuit has been filed in Cleveland as a consequence of the sewer explosion (*see cut*) unofficially blamed on leakage of solvents and other flammable chemicals into the city sewer main. Named as defendants: the city of Cleveland, one paint manufacturer, and two oil companies. Mr. and Mrs. Thomas Danko say that they were injured while driving along West 117 St. when the explosion took place last Sept. 10. The Dankos' petition alleges that the paint and oil companies had been discharging flammable liquids into the sewer, and that the city failed to ventilate or inspect properly.

•

Few Reversals: Findings of the U. S. Patent Office have at least a five-to-one chance of standing when they're appealed to the courts, according to a CW computation of patent lawsuits. Box score on affirmation and reversal of Patent Office decisions by cognizant courts for the past five years:

	Decisions Affirmed	*Decisions Reversed*
U.S. Court of Customs & Patent Appeals	325	62
U.S. District Court, Washington	113	33
U.S. Court of Appeals, Washington	45	8

In addition, numerous patent cases were dismissed from these courts, leaving the Patent Office's ruling in effect. About 200 patent appeal cases were dismissed from the District Court alone in that same period, so that the odds against the person fighting the Patent Office's decision is even higher. These figures refute an earlier statement that the Court of Customs & Patent Appeals "reverses the Commissioner of Patents about as often as it upholds him" *(CW, June 26, p. 22).*

•

Resistance Rises: Opposition to governmental control of natural gas wholesale prices charged by independent producers has been mounting. Besides the moves to have the Supreme Court reconsider its decision and to have Congress pass a new law specifically exempting the independents, there's resistance within regular Federal Power Commission channels. Magnolia Petroleum Co. and Ohio Oil Co. are both filing exceptions to the FPC order requiring such producers to report their present price schedules.

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with a distinctive combination of physical and chemical properties not found in any other form of alkali

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Non-caking
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Available in two bulk density grades
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Low in iron and metallic impurities
Maximum solubility:
15°C—17.9%
25°C—20.3%
55°C—25.2%
75°C—28.9%
Sodium Oxide value
(Na_2O)—41.3%
pH of solutions at 25°C
0.25%—9.8
0.50%—9.8
2.00%—9.7

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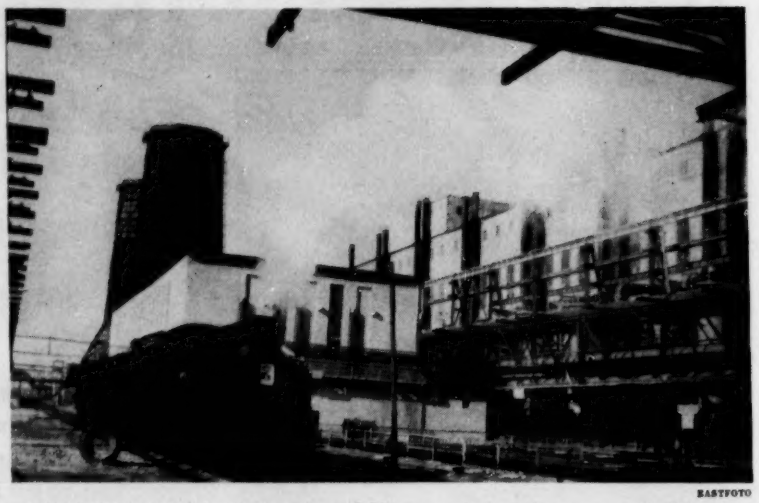

EASTFOTO

STEAMING AHEAD: A late view of Nitrogene Industry's power at Kedzierzeni.

FOREIGN. . . . . .

Expansion/Poland: Production of basic chemicals, according to latest reports from behind the Iron Curtain, is undergoing steady expansion. Heading the list of products registering the greatest gains: nitrogen and nitrogen-derived commodities. Companies such as the Nitrogene Industry, of Kedzierzeni (*see cut*), are reporting output this year running 10-15% ahead of last year's record production rate.

•

Expansion/Canada: Ameba-like, Canadian Industries (1954) Ltd. plans to become larger than its "presplit self" within the next three years. That's the current schedule in Montreal—where company executives are charting an expansion program designed to raise CIL 54's fixed assets from $70 million to more than $126 million by 1957. On tap for special emphasis:

- Rapid build-up of research facilities to the tune of another $2 million by the end of this year.
- Development of a major new industrial project (either in Ontario or in Quebec) to manufacture agricultural chemicals from Alberta natural gas.
- Expenditure of over $4 million for plant modernization.
- Work on a series of studies concerned with the possible production of a number of new products.

•

Chinese Trade: During the past weeks, important secret talks have been taking place in Geneva between Chinese trade experts and various top European industrialists. From the scanty information now available, it appears that discussions have been mainly concerned with possible barter deals. Showing the greatest interest: German and Italian business executives. But since much of the Chinese output of minerals—especially tin and tungsten, which would have been welcomed in Europe as exchange goods—are a Soviet monopoly, the main Chinese commodities available as "bait" are probably items such as silk and tung oil.

•

Paint Enterprise/Cuba: The Glidden Co. has formed a new subsidiary in Cuba to manufacture and market all Glidden paint products. Management will be handled by Cuban nationals; financial backing was provided wholly by islanders. To be known as Fabrica Nacional de Pinturas, S.A., the new company has already broken ground for its first plant, should be in production by next January.

•

Ammonium Sulfate/Spain: The Spanish Ministry of Commerce has authorized new import licenses for 50,000 tons of ammonium sulfate into Spain. These will be in addition to licenses already in existence, will bring the total amount of ammonium sulfate to be imported in the coming months to 100,000 tons.

•

Caustic Soda/Netherlands: The Upper House in the Netherlands has passed legislation approving the establishment of a 51-million-guilder caustic soda plant in Delfzijl. The state will guarantee a security loan of 21 million guilders; the plant will be established by a combine consisting of the Royal Netherlands Salt Industry, the State Mines, the Furnace Gases Co., and the Royal Netherlands Sulphuric Acid Factories. Raw materials will be ob-

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high-quality backed by years of production experience

assured availability because they are made from CARBIDE-produced raw materials

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				In Water	Water In
Ethyl Amine	45.08	0.6836	14.5	inf.	inf.
Diethyl Amine	73.14	0.7062	55.5	inf.	inf.
Triethyl Amine	101.19	0.7293	89.7	5.5	4.6
Isopropyl Amine	59.09	0.6881	32.4	inf.	inf.
Diisopropyl Amine	101.19	0.7178	84.1	inf.	inf.
n-Butyl Amine	73.14	0.7385	77.1	inf.	inf.
Di-n-Butyl Amine	129.24	0.7613	159.6	0.47	6.2
n-Hexyl Amine	101.19	0.7675	131.8	67	1.2
2-Ethylhexyl Amine	129.24	0.7894	169.1	0.25	25.3
Di-2-Ethylhexyl Amine	241.45	0.8062	280.7	<0.02'	0.17

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gel breakers
2, 4-D and 2,4,5-T salts
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B & I . . . . . .

tained from the big Dutch salt deposits in Winschoten.

•

Chemical Output/Russia: Russia's Ministry of the Chemical Industry fulfilled its first-half 1954 production quota by 103%, says the government's official newspaper, *Pravda*. Output of individual chemicals showing the greatest gains: caustic soda (11% over 1953), soda ash (up 12%), mineral fertilizers (up 11%), pesticides (up 31%), synthetic dyes (up 2%) and synthetic rubber (up 1%). Production of chemical equipment has risen 15%.

•

Salt/Peru: Although it won't be officially christened by the Peruvian government until next Oct. 27, Peru's new salt refining plant at Lima is now in operation. Construction for the Estanco de la Sal (a government entity), the plant was built, designed and equipped by Salt Chemicals, Inc., Tarrytown, N.Y., at a cost of $400,000. Under its processing and refining methods, salt will contain—for the first time in Peru—potassium iodide and magnesium carbonate.

KEY CHANGES . .

J. Brian Eby, to director, Texas International Sulphur Co., Houston, Texas.

J. E. Culpepper, to vice-president, sales, Spencer Chemical Co., Kansas City, Mo.

I. Wendell Hamm, to director of manufacturing, The Carborundum Co., Niagara Falls, N.Y.

Arthur F. Smith, to manager of sales, and **Preston F. Tinsley,** to assistant manager of sales, Westvaco Chlor-Alkali Div., Food Machinery & Chemical Corp., New York.

Donald C. Oskin, to manager of sales, and **James R. Harris,** to assistant manager of sales, Westvaco Mineral Products Div., Food Machinery & Chemical Corp., New York City.

George B. Stone, to assistant-to-the-president, Chas. Pfizer & Co., Inc., Brooklyn.

John M. Depp, to plant manager, Kearny Works, Monsanto Chemical Co., St. Louis.

W. H. Stark, to assistant-to-the-president, Standard Ultramarine & Color Co., Huntington, W. Va.

Donald B. McCammond, to assistant to the vice-president and general sales manager, Dewey and Almy Chemical Co., Cambridge, Mass.

BENZENE
TOLUENE
XYLENE

*Night Photograph of Cosden's BTX Plant

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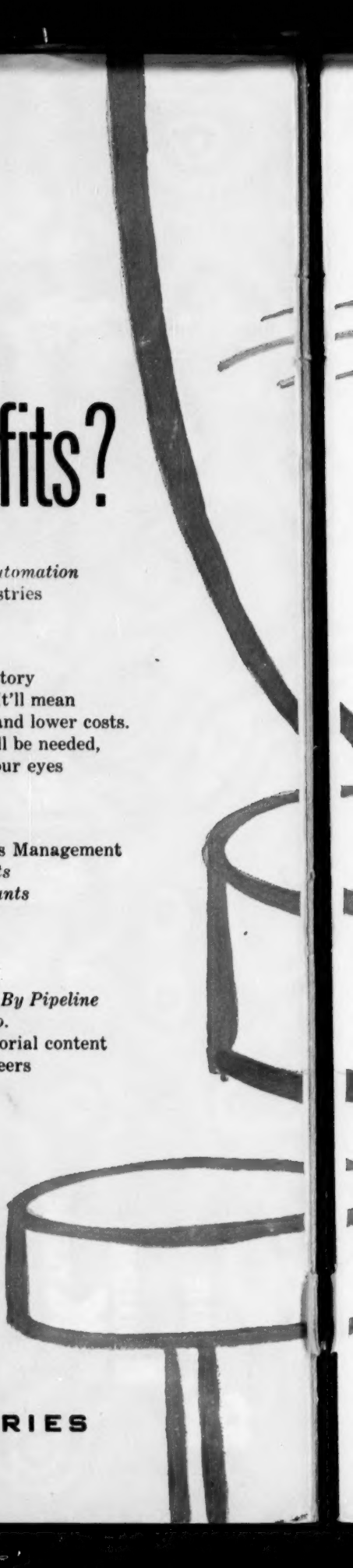

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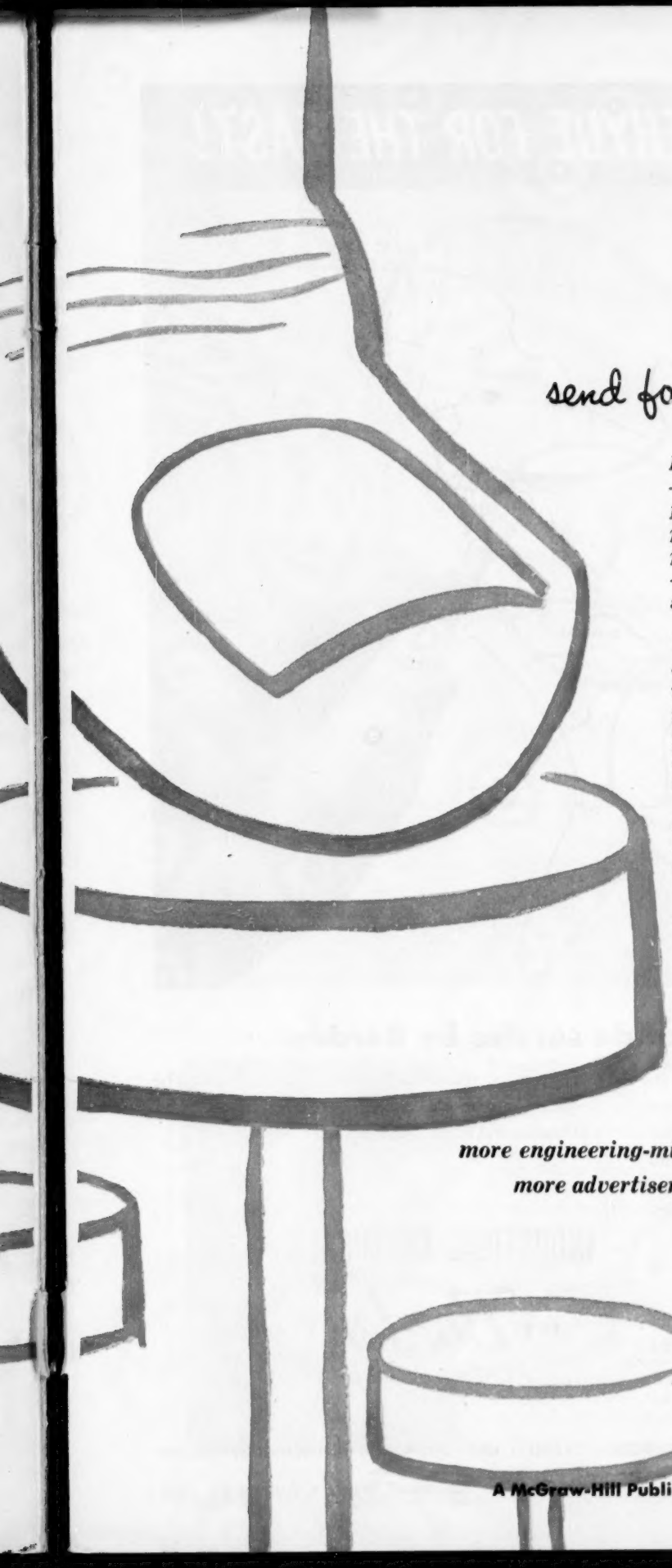

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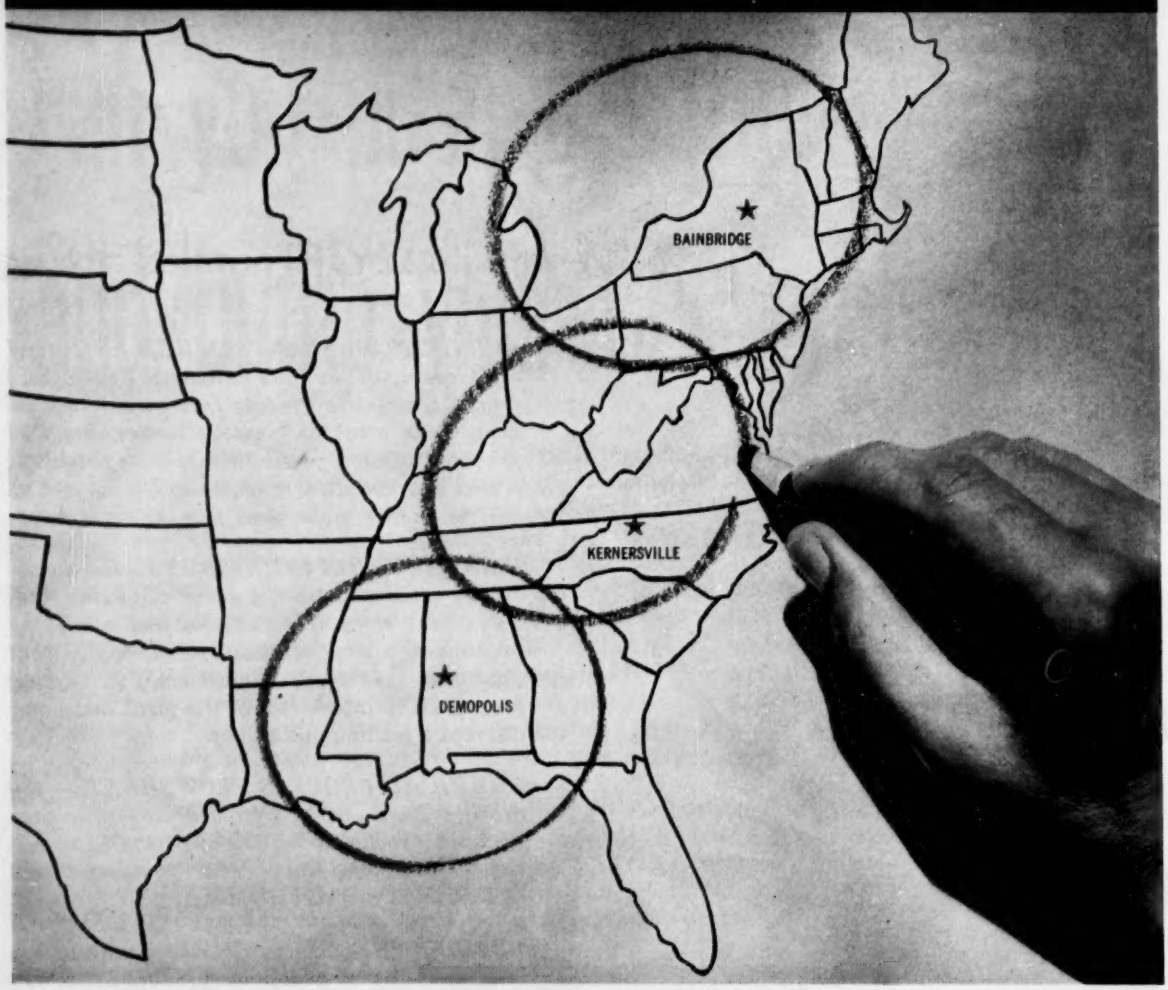

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C W Report

by Christian J. Matthew and Samuel E. Perkins

Fertilizers: Steady Growth, Solid Future

Despite the big jumps in fertilizer production, supply and demand should be in balance by '56.

Here's the rundown, the short- and long-range view on nitrogen, phosphates and potash.

It was just around the start of World War II when the farmer found he could sell more crops than he could produce. Fortunately, he also discovered he could boost his yields considerably by using more fertilizer. Ever since, the chemical industry, straining to supply him, has been pouring out compounds of nitrogen, phosphorus and potassium in ever-increasing quantities. Today, it's as if the farmer forgot to say "when."

Take ammonia, for instance, the farmer's chief source of nitrogen. In 1939, the total U.S. production amounted to 245,000 tons. At that time the industry had a capacity of probably 380,000 tons/year. By the first of this year, it had a capacity of 2,464,000 tons. And this year and next, it's bringing in an additional 948,000 tons (*see table, Ammonia Plants and Their Capacities*).

Ammonia, in fact has experienced a growth perhaps more spectacular than any other tonnage product of the chemical industry. And the record for other fertilizers, while not quite so dramatic, has been nonetheless impressive.

Two to Consider: There's presently a vocal group of experts who maintain that this growth has been artificial, that's it's been stimulated by war and by inflated farm prices. Fertilizer consumption, they feel, is due to level off. It may even decline.

If you concentrate on the long-

Meet the Authors

CHRISTIAN J. MATTHEW (*left*) manager of the West Coast branch of Arthur D. Little, Inc. has been with the firm since he graduated from Massachusetts Institute of Technology in 1943. He has specialized in technical and economic studies including surveys of fertilizer processes and facilities.

Samuel E. Perkins II (*right*) is also a graduate of MIT. At A. D. Little, he's been active in many industrial studies and evaluations. He's been primarily interested in fluid flow and polymers.

Their fertilizer study will be incorporated in a forthcoming issue of ADL's "The Technology Behind Investment."

C W Report

term view, it's fairly easy to refute this stand. Here's how:

The population is growing at the rate of 1.0-1.5% a year. To maintain present living standards, that means a corresponding increase in demand for food and fiber.

At one time, it was possible to meet such increases in demand simply by putting more land under cultivation. But the amount of tillable land not already in use is petering out. The best available opinion, in fact, is that not more than 5% can be added—if any heed is paid to economics.

Formerly too, it was possible to utilize more land through increased mechanization. In that way, land that was needed to supply food for work horses could be put to other uses. But as mechanization is nearing completion, the amount obtainable from that source is fast running out also.

The only solution it seems, is to boost crop yields even further by better farming practices. And that means heavier fertilization.

Translating this line of reasoning into precise figures is, however, difficult. But the U.S. Department of Agriculture has made a very revealing study. It found that getting a 1% increase in yield from land deficient in nitrogen called for 25% increase in the use of nitrogenous fertilizer. Comparable figures for phosphorus and potassium are 15% and 50%.

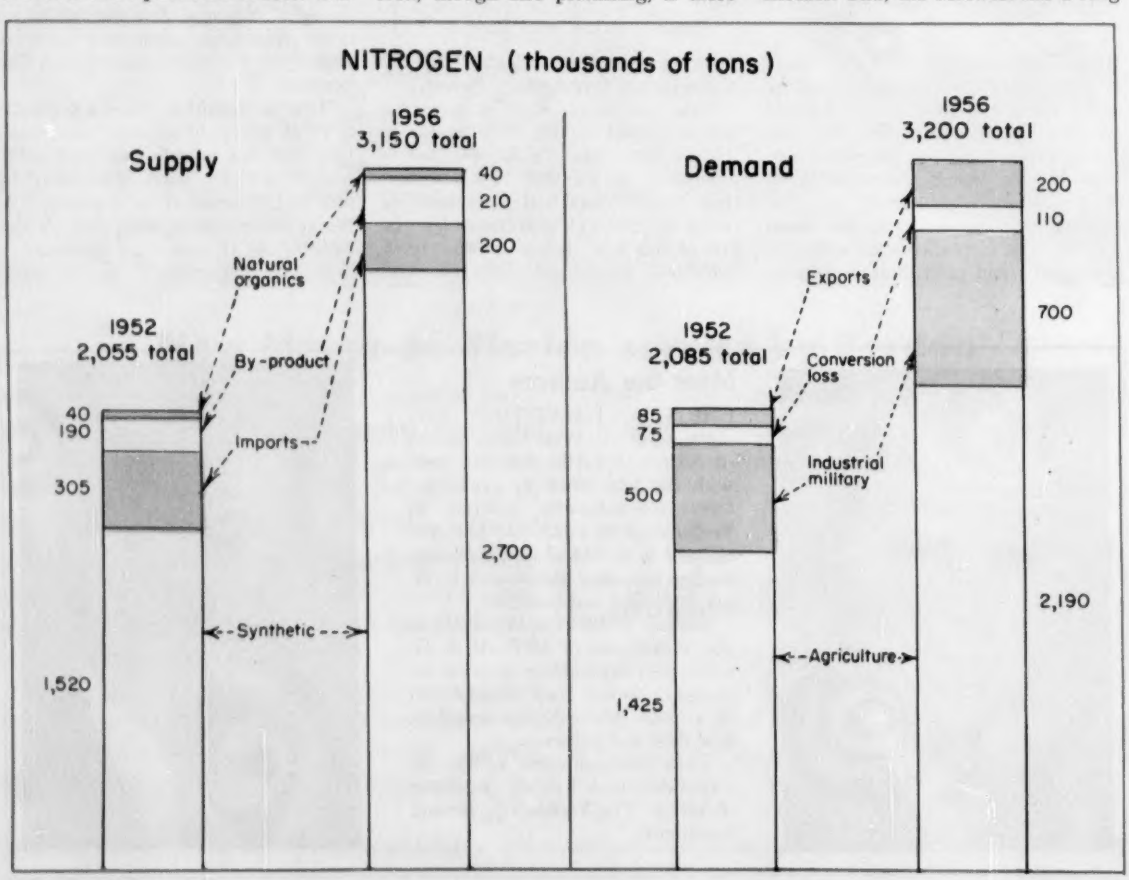
These figures are necessarily rough because of the cumulative effect of the three fertilizer ingredients. Moreover, most soils tend to be deficient in all three and application of a complete fertilizer would give a larger increase proportionally.

They leave no doubt, however, but that it will take a sizeable increase to meet the food requirements of our growing population.

Due to Grow: The short-range outlook, though also promising, is more difficult to assess. One good yardstick is an equation worked up by the U.S.D.A. to show the relation between farm income and expenditures for fertilizer. Up to 1948, the equation shows a striking correlation between the two. From that point on, the actual consumption of fertilizer is even higher than the income would indicate.

There are several reasons for the discrepancy after 1948. But probably the most significant is the growth of fertilizer consumption in the important Midwest farming regions. For while the states along the Atlantic Coast and the Gulf are relatively mature fertilizer customers, the ones in the central portion of the country have only lately learned what fertilizers can do for them. Agronomic experiments, moreover, show that farmers in those states can use even more fertilizer and still raise their profits.

The optimum rate of fertilizer application in the Midwest may never reach the levels attained in the Southeast, for it's not possible to project fertilizer experience from one area to another. Still, the Midwest has a long



U. S. Ammonia Plants and Their Capacities

Company	Location	Capacity in tons/year		
		Jan. 1, 1954	Projected	Jan. 1, 1956*
Allied Chemical and Dye	Hopewell, Va.	340,000	50,000	
"	South Point, O.	273,000	—	738,000
"	La Platte, Neb.	—	75,000	
American Cyanamid	Avondale, La.	—	100,000	100,000
Atlantic Refining	Philadelphia, Pa.	—	35,000	35,000
Brea Chemical (Union Oil)	Brea, Calif.	—	82,000	82,000
Columbia-Southern (Pittsburgh Plate Glass)	Natrium, W. Va.	—	30,000	30,000
Commercial Solvents	Sterlington, La.	70,000	64,000	134,000
Coop. Farm Chemicals	Lawrence, Kan.	—	60,000	60,000
Deere	Pryor, Okla.	—	63,000	63,000
Dow Chemical	Freeport, Tex.	48,000	—	
"	Midland, Mich.	24,000	—	76,000
"	Pittsburg, Calif.	4,000	—	
Du Pont	Belle, W. Va.	210,000	—	
"	Niagara Falls, N. Y.	9,000	—	219,000
W. R. Grace	Memphis, Tenn.	—	87,000	87,000
Hercules Powder	Hercules, Calif.	28,000	—	
"	Louisiana, Mo.	—	42,000	70,000
Hooker Electrochemical	Tacoma, Wash.	25,000	—	25,000
Lion Oil	El Dorado, Ark.	210,000	—	
"	Luling, La.	—	105,000	315,000
Mathieson Chemical	Lake Charles, La.	98,000	—	
"	Niagara Falls, N. Y.	7,000	—	315,000
"	Morgantown, W. Va.	210,000	—	
Mississippi Chemical	Yazoo City, Miss.	63,000	35,000	98,000
National Distillers	Tuscola, Ill.	—	50,000	50,000
Pennsalt Mfg.	Wyandotte, Mich.	29,000	—	29,000
Phillips Chemical	Etter, Tex.	160,000	—	
"	Houston, Tex.	150,000	—	310,000
San Jacinto Chemical (Smith-Douglass)	Houston, Tex.	38,000	—	38,000
Shell Chemical	Pittsburg, Calif.	95,000	—	
"	Ventura, Calif.	54,000	—	149,000
Spencer Chemical	Henderson, Ky.	70,000	—	
"	Vicksburg, Miss.	—	70,000	320,000
"	Pittsburg, Kan.	180,000	—	
TVA	Wilson Dam, Ala.	67,000	—	67,000
TOTAL		**2,462,000**	948,000	**3,410,000**

* In this report, the authors zero in on capacity that will be in place by the end of next year. As they explain in the text, other plants—some of which may well be running by that time—represent another 515,000-ton potential. And some industry sources think even that's conservative, that the total synthetic capacity during 1956 may be closer to 4.5 million tons.—Ed.

C W Report

way to go before it becomes a saturated fertilizer market.

Barring a recession, then, it seems clear that the fertilizer demand is due for a steady rise at least for several years. At the same time, it's likely that as more plants come in, competition will become keener.

Already some changes are being felt by producers of the three most important ingredients of commercial fertilizers, nitrogen, phosphates and potash.

Nitrogen

Though there are several sources of nitrogen, synthetic ammonia is far and away the most important. As of Jan. 1, this year, there were 24 plants in operation with a capacity of about 2.46 million tons of ammonia, equivalent to 2.02 million tons of nitrogen. Fifteen more plants with a capacity of 948,000 tons of ammonia (780,000 tons of nitrogen) are either just completed or under construction. And at least ten others have been proposed or projected. These latter represent a potential of 515,000 tons of ammonia. If they're completed on schedule, the total U.S. capacity in 1956 would be about 3.925 millions tons of ammonia (3.2 million tons of nitrogen).

By-product ammonia accounted for 190,000 tons of nitrogen in 1952. Because it's limited by the coking capacity at steel mills and utility coke plants, this source is not likely to grow significantly – probably to 210,000 tons by 1956. The supply from natural organics (dried sewage, tankage and cottonseed meal) will remain about the same and imports may decrease somewhat.

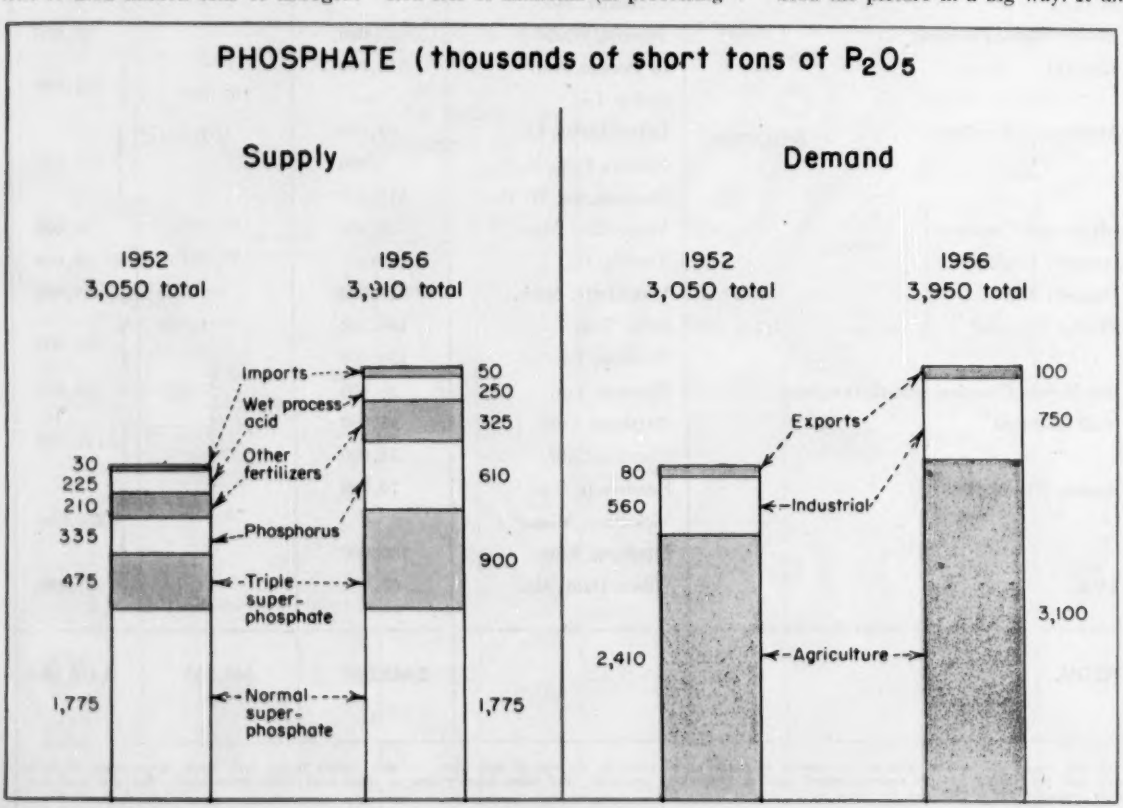
It all adds up to a nitrogen supply in 1956 of 3,150,000 tons/year.

Balancing Up: Demand for nitrogen in the meantime is due for some hefty boosts, too. Agriculture, which took 1.4 million tons of nitrogen in 1952, will probably account for 2.19 million tons by 1956. Similarly, the industrial and military market for nitrogen will grow—from 500,000 tons in 1952 to 700,000 tons in 1956. And the conversion loss of ammonia (in processing it to the various end-products) will naturally show a corresponding increase. It should go from 75,000 tons to 110,000 tons. Exports, which will probably amount to 200,000 tons in 1956, will swell the total U.S. nitrogen demand to 3.2 million tons.

Thus by 1956, the supply and demand for nitrogen may well be closely in balance. It means that the nitrogen producers may be heading toward a period of tight competition, considerably tighter than they've experienced in the recent past.

This period, may, of course, be short-lived. The U.S.D.A. has calculated that to keep pace with the growth of population, nitrogen producers must up their stake by 100,000 tons/year—every year. But by the same token, if more plants are built —as now seems probable—the industry may have to continue operations at less than full capacity.

Picking up Speed: Back in the late '30s, Allied Chemical at Hopewell, Va., and Du Pont at Belle, W. Va., were the two biggest producers of synthetic ammonia. Between them, they owned over 90% of the total U. S. capacity, which at that time was probably 380,000 tons/year. With the start of the war, the government entered the picture in a big way. It un-



U.S. Triple Superphosphate Plants and Their Capacities

Company	Location	Capacity in tons/year		
		Jan. 2, 1954	Projected	Jan. 1, 1956
In the East†				
Armour	Bartow, Fla.	150,000	50,000	200,000
Davison Chemical	Bartow, Fla.	—	200,000	200,000
F. S. Royster Guano	Bartow, Fla.	—	50,000	50,000
I. P. Thomas	Paulsboro, N. J.	15,000	—	15,000
Missouri Farmers Coop.	Galena, Kan.	—	—	*
Phillips Chemical	Houston, Tex.	—	150,000	150,000
Thurston Chemical	Joplin, Mo.	—	35,000	35,000
TVA	Wilson Dam, Ala.	150,000	—100,000	50,000
U. S. Phosphoric Products (Tennessee Corp.)	Tampa, Fla.	350,000	50,000	400,000
Virginia-Carolina Chemical	Charleston, S. C.	15,000	15,000	130,000
"	Nichols, Fla.	—	100,000	
Swift	Bartow, Fla.	40,000	40,000	80,000
In the West				
Anaconda Copper Mining	Anaconda, Mont.	100,000	—	100,000
Gates Bros. (Jefferson Lake Sulfur)	Montpelier, Idaho	—	50,000	50,000
Simplot Chemical	Pocatello, Idaho	—	35,000	35,000
Western Phosphates	Salt Lake City, Utah	—	60,000	60,000
TOTAL		820,000	735,000	1,555,000

† International Minerals, though not now producing triple superphosphate, turns out a "multiple" superphosphate at Bonnie (Fla.) that analyzes over 50% P_2O_5 (as opposed to 18% for normal super, 45-48% for triple super). Its capacity the first of this year was equivalent to 40,000 tons of triple. It's bringing in a regular triple super unit at Bonnie next month, moreover, figures that by the end of next year it will be making multiple and triple super equivalent to 100,000 tons/year of regular triple.—Ed.

* Production capacity has not been revealed.

dertook the construction of ten synthetic ammonia plants, including the reactivation and completion of the TVA facilities at Muscle Shoals, Ala.

After the war, the government disposed of the ten plants, whose designed capacity was 957,000 tons/year.

At present, Allied, with a plant at South Point, Ohio, as well as the one at Hopewell, is the biggest producer. Following in order of size are Mathieson, Spencer, Du Pont and Phillips Chemical. Of the new plants being built or just completed, the largest are those of Lion Oil, American Cyanamid, Phillips Petroleum and W. R. Grace.

Most of the ammonia made by these firms must be turned into a different form before it's suitable for use in agriculture. The most popular forms in 1952 were nitrogen solutions, which are essentially water solutions of ammonium nitrate or urea to which free ammonia has been added. These solutions are the most important source of nitrogen for mixed fertilizers and the cheapest outside of anhydrous ammonia.

Important producers of nitrogen solutions include Allied Chemical, Du Pont, Spencer Chemical and Lion Oil.

Another form that's popular is ammonium sulfate. Normally, it's used to provide additional nitrogen to mixed fertilizers, for, since it is not hygroscopic, it goes beyond the limits possible with solutions.

But some sulfate is being fed

Principal Producers of Normal Superphosphate and Their Capacities

Company	Estimated Production in Tons (18% P_2O_5)
American Agricultural Chemical	1,150,000
Armour	865,000
Davison Chemical	865,000
Virginia-Carolina Chemical	670,000
International Minerals & Chemical	575,000
Swift	480,000
F. S. Royster Guano	380,000
Mathieson Chemical	380,000
Total	5,365,000
U. S. TOTAL	9,595,000

C W Report

to the soil directly. At present, Phillips ranks as the biggest producer of ammonium sulfate; firms like Mathieson, Lion Oil and Best Fertilizer are important factors too.

Of the solid materials applied directly to the soil, ammonium nitrate is easily the most important. On a nitrogen basis it's cheaper than sodium nitrate, partly imported (from Chile) and another important form of solid nitrogen. And as industry steps up its promotion in the Southeast, ammonium nitrate and other concentrated forms of nitrogen are apt to gain even more ground at the expense of imported sodium nitrate.

Largest makers of the ammonium nitrate here are TVA, Spencer, Allied and Lion Oil. Consolidated Mining and Smelting is a major producer at Trail, B. C.

Switch in Solids: Although the government has encouraged production boosts for all derivatives of ammonia, it has placed particular emphasis on urea and nitrophosphates, both of which are at present relatively insignificant sources of nitrogen. The reason for this is believed to be a desire to convert at least a portion of the synthetic nitrogen into high-analysis, solid carriers other than ammonium nitrate.

A number of firms are obliging; they're either converting or planning to convert a major portion of their synthetic ammonia into urea. Allied, for example, has expanded its urea plant at South Point, is just bringing in a new one at La Platte, Nebr. Deere at Pryor, Okla., and W. R. Grace at Memphis, Tenn., are also planning to divert a big portion of their ammonia output to urea.

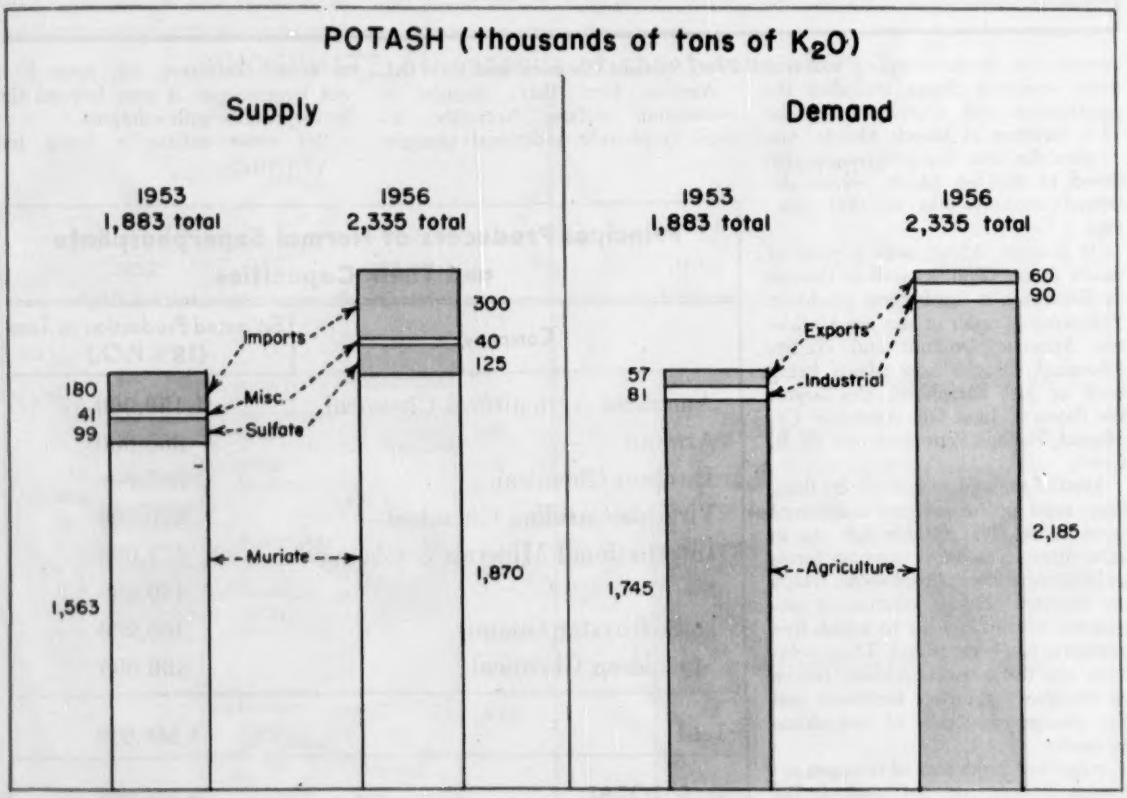
The likelihood of a large portion of ammonia capacity being used for the production of nitrophosphates, however, is more questionable. Allied is going ahead with its big, 200,000 ton/year plant at South Point and Associated Cooperatives is building one at Sheffield, Ala., next door to the TVA operations (*CW, Aug. 14, '54, p. 75; et priori*). But though a raft of other firms have either evinced interest in the idea or received certificates of necessity, there's no word on any other current activity along those lines.

Phosphates

Among the three essential ingredients of commercial fertilizers, phosphorus is unusual in that it's the only one in which the U.S. has been self-sufficient since the early days of the fertilizer industry.

This country's first phosphate mines were located in South Carolina and Tennessee. These deposits have been virtually depleted; the fertilizer industry has for the most part been dependent on phosphate rock from Florida. Recent improvements in methods of beneficiating ores, moreover, have permitted the recovery of phosphate fines that were at one time discarded. Hence many of the properties that had been considered less desirable contain some of the richest reserves of phosphate in the country.

Also recently, rich deposits have been uncovered in the western section of the country, particularly in Montana, Idaho and Wyoming. And even though some big mines are being worked in that area, information on the extent of the reserves is not complete. The data that is available, however, indicates that although the qual-



ity of the ore may not equal that in Florida, the Western reserves of phosphate rock may well be the biggest in the world.

Although there are a number of companies having holdings of properties in Florida containing phosphate rock, only eight are mining there today. International Minerals and Chemical, believed to have the highest quality reserves, also is the biggest operator. It's followed in order by American Cyanamid and Virginia-Carolina (which also owns high-quality reserves).

Coronet Phosphate Co.,—recently purchased by Smith-Douglass—is another firm possessing rich deposits. Perhaps the most extensive deposits are held by the American Agricultural Chemical Co. which has been primarily interested in low-grade rock.

Normal and Triple: Historically, the most important way to make the phosphorus in insoluble phosphate rock more available to plants has been to convert it into superphosphate by digesting the rock with sulfuric acid. Superphosphate, in fact, is still far and away the most popular phosphorus fertilizer among farmers. The trend to more concentrated fertilizers, however, makes it probable that superphosphate will lose its percentage of the phosphorus fertilizer market.

Right now there are about 200 producers of normal superphosphate with a reported production of 9.6 million tons. But eight companies that own 103 plants account for roughly 55% of the total (*see table, Producers of Normal Superphosphate and Their Production*).

Because the superphosphate business is seasonal in nature, pinpointing capacities is difficult. But as far as production is concerned, American Agricultural Chemical which turns out an estimated 1.15 million tons of superphosphate—on an 18% P_2O_5 basis—(or about 12% of the industry's total) is the biggest. Armour and Davison, each of which makes probably 9% of the total, are believed to be about tied for second place.

One of the first big steps taken toward getting more concentrated fertilizers was the development of triple superphosphate, made by digesting phosphate rock with phosphoric*—instead of sulfuric—acid. It's one of the fastest growing fertilizer products, in spite of the fact that making it is a more complex chemical operation than making normal superphosphate; it also entails a considerably higher initial investment.

There are presently only seven manufacturers of triple superphosphate, the biggest of which is the U.S. Phosphoric Products Division of the Tennessee Corp. with a capacity of 350,000 tons/year. Armour and TVA with capacities of 150,000 tons/year are other major producers in the East while Anaconda with a 100,000 tons-a-year capacity is the leader in the West.

By the end of next year, eight more firms are slated to be making triple; still others will have added capacity. Davison and Phillips are bringing in big plants, for instance, and Armour and U.S. Phosphoric are adding substantially to their current output. If, in fact, all the plants presently under construction are completed on schedule, capacity by the end of next year will be almost double what it was at the start of this year.

And the share triple takes of the fertilizer market will continue to grow at the expense of normal superphosphate. In five years, triple may account for nearly one-third the total fertilizer requirements for phosphates.

* Wet process phosphoric (made from phosphate rock and sulfuric) is employed by all producers except the TVA. The latter gets its phosphoric from elemental phosphorus.

U.S. Potash Producers and Their Capacities

Company	Capacity in short tons/year of K_2O		
	Jan. 1, 1954	Projected	Jan. 1, 1956
Potash Co. of America	425,000	25,000	450,000
International Minerals and Chemical	375,000	50,000	425,000
U. S. Potash	350,000	30,000	380,000
American Potash and Chemical	200,000	—	200,000
Duval Sulfur and Potash	180,000	20,000	200,000
Southwest Potash	150,000	50,000	200,000
Freeport Sulphur	—	150,000	150,000
Others	20,000	10,000	30,000
Total	**1,700,000**	**335,000**	**2,035,000**

Potash

It was relatively recent that the U.S. became self-sufficient in potash. In 1920, American Potash and Chemical became an important domestic producer by recovering muriate of potash from the brines of Searles Lake in California. Even so, total domestic production met only 5% of the country's needs.

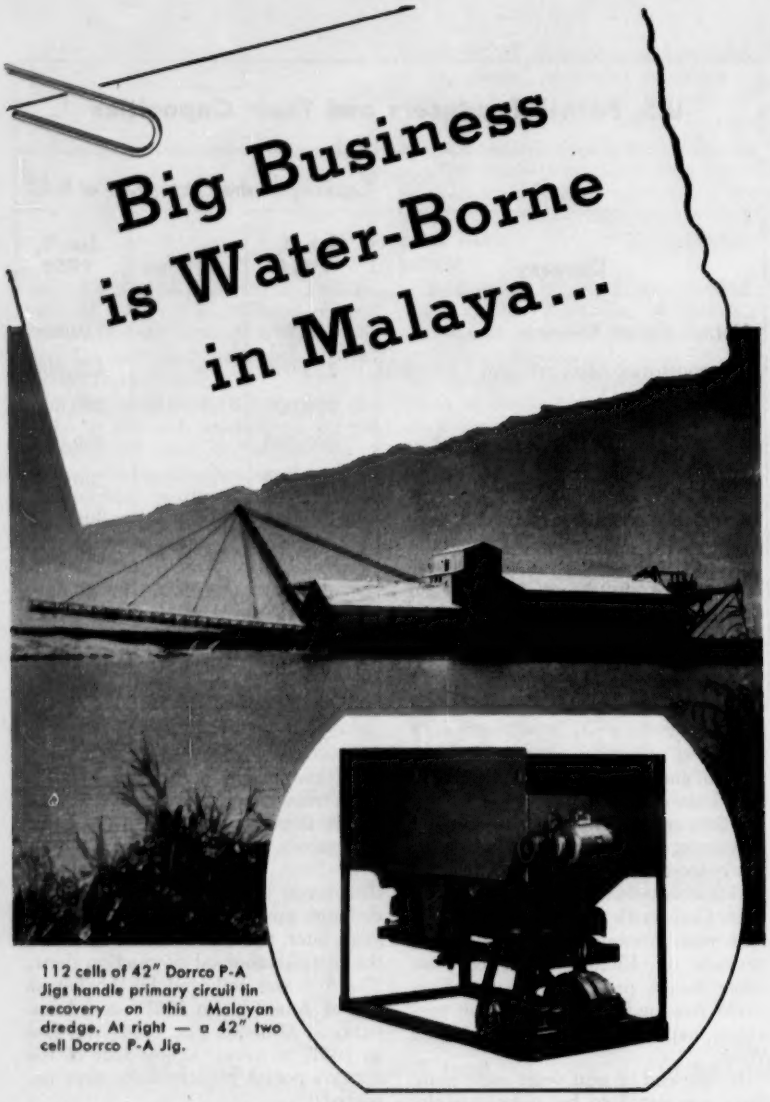
In 1925, potash-bearing ores were discovered in cuttings from oil well drillings around Carlsbad, N. M. Six years later, the U.S. Potash Co. started the first commercial production there. The firm was followed by the Potash Co. of America (in 1935) and International Minerals (in 1940). As late as 1937, however, almost half of the nation's potash requirements were imported.

But despite this relatively slow start, the domestic potash industry has achieved an impressive stature. For while the U.S. owns less then 0.3% of the world's known potash reserves, it accounts for roughly 35% of the production.

With its estimated capacity of 425,000 tons/year (K_2O), the Potash Co. of America is the biggest producer. And although all the companies are loath to discuss their reserves, it is believed that the Potash Co. of America has high-quality reserves that occur in thin seams. Its mining costs, therefore, may be somewhat higher than those of others in the field.

Running a close second is International Minerals which, as a result of recent expansions, can probably turn out about 375,000 tons of K_2O/year. It's understood that IMC's reserves are slightly lower in quality than some of the others. On the other hand,

Big Business is Water-Borne in Malaya...



112 cells of 42" Dorrco P-A Jigs handle primary circuit tin recovery on this Malayan dredge. At right — a 42" two cell Dorrco P-A Jig.

Placer tin mining is big business in Malaya — source of better than a third of total world production. And dredging for the tin-bearing matrix is a big tonnage operation. For instance, the 304' dredge pictured above can dig 480,000 cubic yards per month from 130 feet below water level.

The bucket line discharges matrix to a trommel screen where oversize waste is separated from minus ⅜" feed for further processing. First step, and point of maximum tin concentration — fourteen batteries of Dorrco P-A Jigs, each comprising eight 42" x 42" cells. These units are compact and light in weight — important considerations in water-borne operations.

Tin recovery in Malaya may be of academic interest only to you. But, if you have problems involving any phase of the separation of finely divided solids in suspension — or ion-exchange — or fluidizing techniques... chances are that our worldwide organization can help you.

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C W Report

it's the only company that has deposits of langbeinite, a mineral containing potassium sulfate. And the sulfate is a premium-priced product necessary for certain crops (e.g. tobacco) that can't be exposed to chloride salts like muriate of potash. The other firms produce potassium sulfate by treating the muriate with sulfuric acid.

Next in order of size is U.S. Potash Co., with a capacity of 350,000 tons of K_2O/year. Although the firm has been working its mines longer than any of the others, its reserves are probably adequate. Further, it has high-grade deposits, and since it operates in relatively thick veins, it probably has an edge on the others as far as mining costs are concerned.

Newcomers in the industry are Duval Sulphur and Potash which started mining in the Carlsbad area in the spring of '52 and Southwest Potash Corp., a subsidiary of American Metals Co., which started up the following fall. They are believed to have annual capacities of 180,000 tons and 150,000 tons of K_2O respectively.

By the end of 1955, all the companies that operate in the Carlsbad area will probably have higher capacities. The only one, in fact, that is not likely to expand is American Potash and Chemical whose output is tied directly to the amount of brine processed. Also, potash production must be integrated with the production of all chemicals recovered from the brine.

In addition to the expansion of present producers, Freeport Sulphur may start mining in the near future. It has extensive holdings around Carlsbad and if it starts up with a capacity comparable to other recent entrants, the total domestic supply of potash may well top 2 million tons of K_2O equivalent per year.

In spite of the healthy proposed increases in production, however, the supply and demand should come very close to balance by 1956. Supply may even run slightly behind demand so that imports will have to be stepped up (from 180,000 tons to 300,000 tons) to meet the projected requirements of both industry and agriculture.

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Produced by *specialists* in "essential chemicals from hydrocarbon sources."

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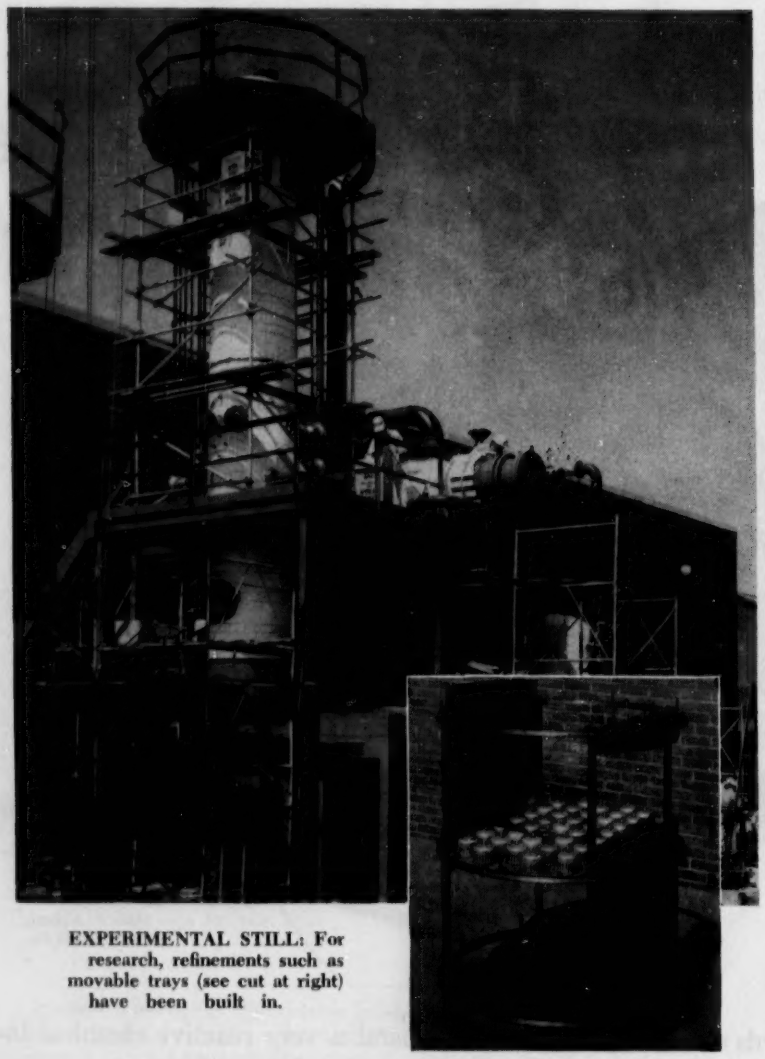

EXPERIMENTAL STILL: For research, refinements such as movable trays (see cut at right) have been built in.

From Common Ground

Production problems, like politics, make strange bedfellows. And when those problems spring from common ground, reasons Thomas B. Hudson,* it should prove easy to persuade processing firms to subscribe to a joint research venture in order to multiply their problem-solving efforts, divide their alloted expenditures. After a cross-country tour, talking to potential subscribers, Hudson returned to California last week as workmen put the finishing touches (*see cut*) on his two-year-old idea, completed construction of Fractionation Research's experimental distillation unit at Alhambra.

Together with a leased simulator unit, the new distillation tower marks the end of FR's facilities fabrication, the beginning of full-scale experimentation. While some potential client-owners are still in the offing, 42 signed stockholders are already in the fold, some since 1952. Among those participating: Koppers, Lummus, Phillips, Catalytic Construction, and Fluor. The balance is composed primarily of petroleum companies with a small admixture of petrochemical, natural gas and engineering firms.

FR's Floorplan: Having selected problems in fractionation as its common denominator, FR actually incorporated April 4, 1952; specifically it is "a cooperative organization formed to develop design information on the construction and operation of full-scale fractionating columns." Present plans call for only a five-year (dating from April 4, 1952) period of incorporation.

Stockholders purchase one share of FR stock, contribute to a research fund on a scale graduated according to the amount of stocks held; minimum contribution for the five-year period is $5,000, maximum is $100,000. No matter at what point they enter the venture, newcomers must pay full fare.

In return, stockholders receive monthly progress reports, royalty-free licenses to devices or processes developed during the program, results of already-completed patent and literature searches on the subject, and the right to place one member on FR's policy-making board of directors and another on the research-directing Technical Advisory Committee.

It was the TAC that decided—by voting—to start the ball rolling with the investigation of bubble-cap trays. After canvassing the field it chose Erwin Amick (former Dean of Chemical Engineering at Columbia University) as technical director, Francis Winn (former design engineer at Catalytic Construction Co.) as his assistant. The TAC at the first of each year decides upon the budget (which then must be approved by stockholders). After the present project is completed, the committee will decide where to proceed next.

Amick and Winn, together with a junior engineer, make up the project's only permanent operating personnel; they will generally oversee the setup; and among other things, Amick and Winn will analyze and evaluate collected data before it is passed on to stockholders. Other workers (chemical operators, secretaries, et al) will be brought in on a pay-as-you-work basis under an unusual arrangement with stockholder C. F. Braun & Co., whose land FR occupies (and whose simulator FR has leased).

Sum & Substance: Plans call for initial testing to be carried out on the small-scale simulator unit; if the first tests are successful, they will then be tried on a commercial (i.e., the experimental column) scale for size. The final step is operation in stockholders' standard columns to check out conclusively information previously obtained. Although the simulator and

* With Phillips Petroleum Co. for 25 years, Hudson currently serves on Phillips' planning board. He will function concurrently as president of Fractionation Research, but will draw no salary for this position.

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Hydrogen bromide yields 2-bromotetrahydropyran, which in turn reacts with Grignard reagents to give alkyl and aryl tetrahydropyrans.

Chlorination gives 2, 3-dichlorotetrahydropyran, which on distillation loses HCl to give 5-chlorodihydropyran.

Hydrolysis with dilute mineral acid results in addition of water to the double bond followed by splitting of the ring to give deltahydroxyvaleraldehyde.

1,5-PENTANEDIOL (Pentamethylene glycol) reacts like other glycols. Dehydration, oxidation, esterification, and acetalization reactions provide a variety of derivatives.

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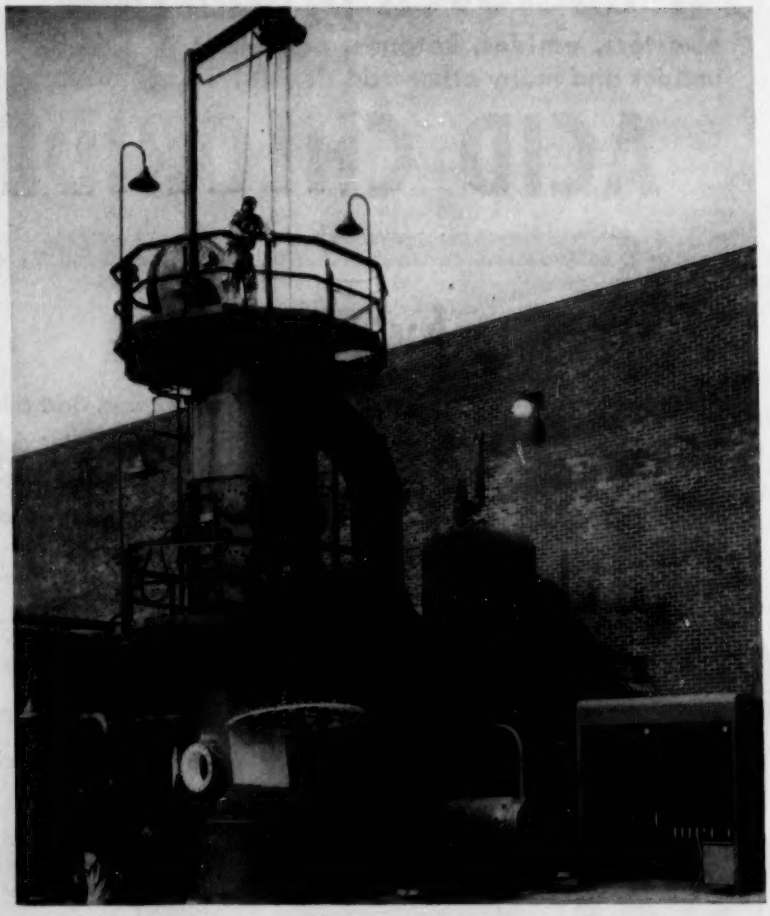


SIMULATOR: On a small scale, it filters out unworkable ideas.

experimental units sit within 50 ft. of each other, they will run only in alternate spans, shut down sporadically while data is collected and analyzed.

While the simulator is simply a small-scale still for use at atmospheric pressure, the experimental unit is similar to a standard fractionating column with certain refinements added. Among the addenda:

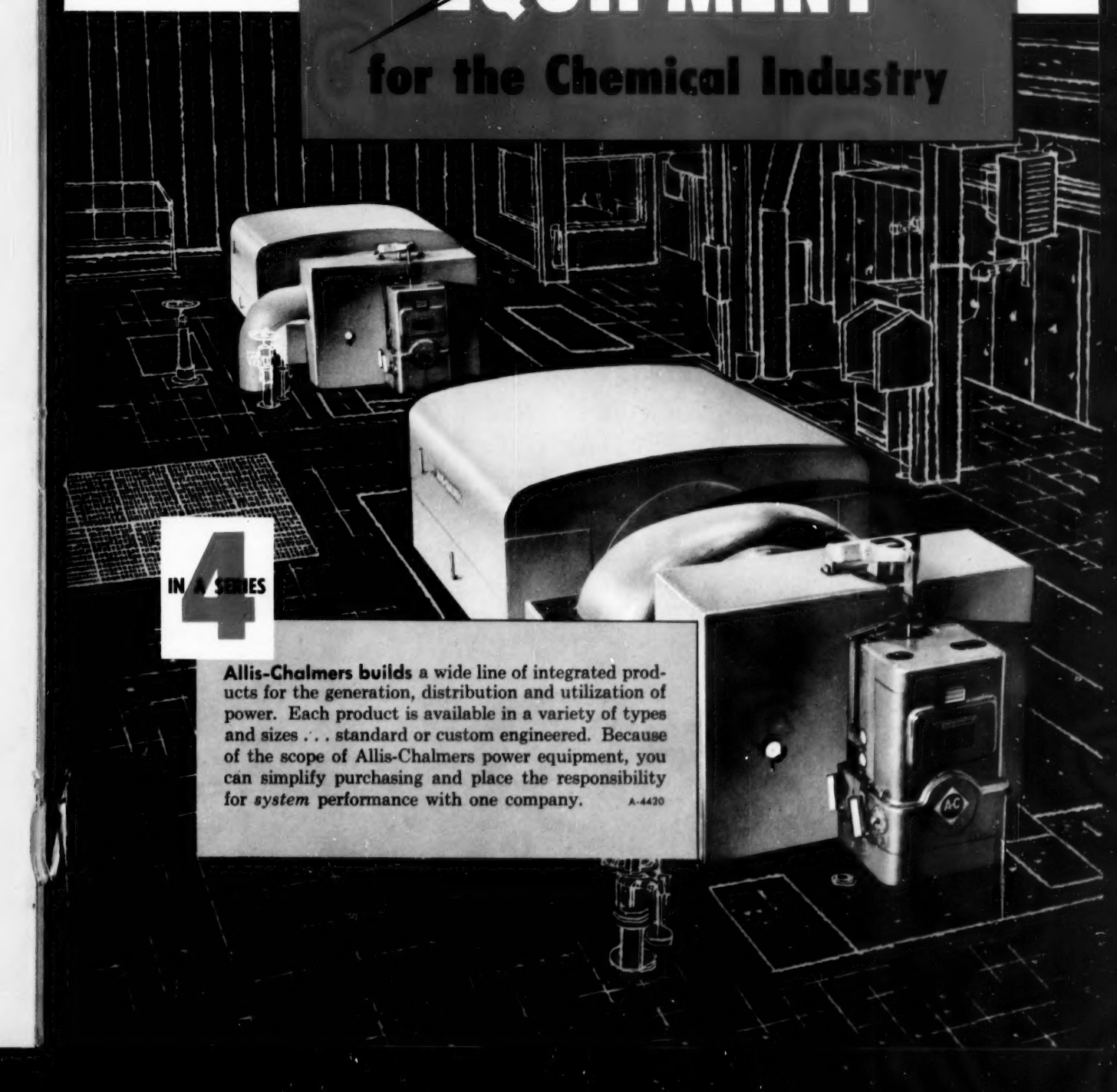
- Interior lighting and windows will be used for taking colored movies that will be available to stockholders. Black-and-white movies, says Hudson, do not show clearly such things as frothing and liquid levels.
- Facilities for movable trays will enable researchers to make adjustments, find ideal levels for standard and any newly developed trays.
- Stronger construction than com-

AMICK, WINN AND HUDSON: They cull the common problems.

ALLIS-CHALMERS

POWER EQUIPMENT

for the Chemical Industry



IN A SERIES 4

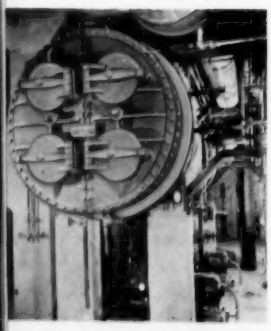
Allis-Chalmers builds a wide line of integrated products for the generation, distribution and utilization of power. Each product is available in a variety of types and sizes . . . standard or custom engineered. Because of the scope of Allis-Chalmers power equipment, you can simplify purchasing and place the responsibility for *system* performance with one company. A-4420

generation

WA-SERIES STEAM TURBINE-GENERATOR UNITS

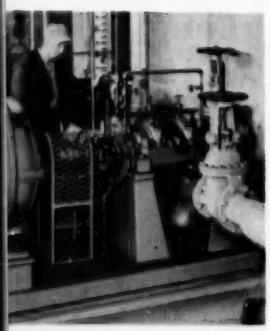
Available for either condensing, non-condensing, and automatic extraction operation, these units combine an impulse steam turbine and housing type air-cooled generator in a compact three-bearing arrangement. Features include labyrinth steam seals throughout, high chrome alloy steel buckets and time-proved governing system. Oil piping and simplified generator cooling system are above foundation. WA-Series units are built in sizes 2000 kw and larger in NEMA standard ratings. Larger steam turbine-generator units are also available.

CONDENSERS



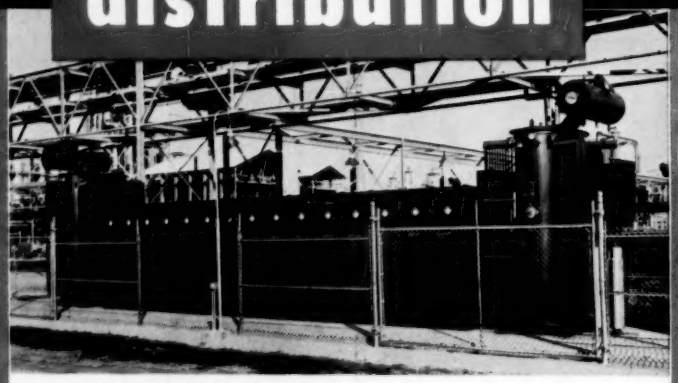
Allis-Chalmers condensers are built with rectangular, elliptical or round cross sections. This choice of shapes permits maximum utilization of available space. Allis-Chalmers "Multi-Steam-Path" design insures efficient flow of exhaust steam throughout the entire condenser, making all sections active. Condensers are available in all sizes.

PUMPS



Allis-Chalmers builds centrifugal, axial and mixed flow pumps for practically every power plant service . . . boiler feed, water circulation, condensate, heater drain, coolers, heating systems, etc. Sizes range from small compact pumps handling a few gallons per minute to huge units pumping 110,000 gpm.

distribution



UNIT SUBSTATIONS

Switchgear is the key to power continuity demanded by chemical plant automation. Allis-Chalmers engineering has specialized in this type of equipment . . . switchgear which offers the following advantages:

Saves Space — Compartments are designed to permit adding special transfer bus or ring bus without adding cubicles.

Saves Cost — By eliminating duplicate facilities or extra cubicles, Allis-Chalmers switchgear cuts equipment cost.

Saves Time — Dry-type bus joint insulation simplifies adding and removing cubicles. No compounds to melt . . . no fuss . . . no muss.

In the substation illustrated, double-ended switchgear is combined with duplicate Allis-Chalmers power transformers.

DRY-TYPE TRANSFORMERS

Installed close to the load center, Allis-Chalmers dry-type transformers provide correct utilization voltages for efficient motor operation, flicker free lighting and full heating of thermal equipment. Long secondary runs are eliminated, distribution losses minimized.

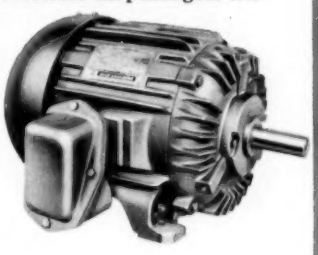
Allis-Chalmers dry-type transformers can be placed anywhere . . . on walls, platforms, posts — even on the machines they serve. No vaults are needed. Available in a wide size range — single phase, 200 kva and lower, three phase, 300 kva and lower, 600 volts and below. Illustrated is the completely enclosed dry-type transformer rated 50 kva and smaller. This model is particularly applicable to dusty atmospheres. General purpose, hermetically sealed and open ventilated designs are also available.

ALLIS-CHALMERS

utilization

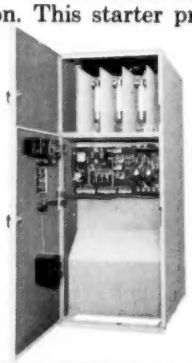
MOTORS

Allis-Chalmers builds standard and special motors for practically every purpose. Illustrated is the totally-enclosed, fan-cooled, explosion-proof motor which is especially suited to chemical industry conditions. Frames are corrosion-resistant cast iron. Rib-type design provides ample reserve cooling capacity. No inaccessible air passages. Improved bearing design affords maximum protection against foreign matter — facilitates in-service lubrication. Built in ½ to 100 hp range, these motors are now available in the new NEMA frame size standards.



CONTROL

Allis-Chalmers offers a complete line of manual and magnetic, full and reduced voltage starters. The Type H starter, shown here, is a high capacity motor controller with built-in short circuit protection. This starter provides complete control for 2300-5000 volt motors. Oil-immersed or air-break contactors, meters, relays, current limiting fuses, auxiliary switches . . . everything needed to provide high capacity interruption and maximum protection for man, motor and machine is engineered into one cabinet.



ALLIS-CHALMERS POWER EQUIPMENT

POWER GENERATION

STEAM TURBINES . . . for power plant and marine applications.
HYDRAULIC TURBINES . . . Francis, propeller and impulse types . . . all sizes.
GENERATORS . . . synchronous, induction, direct current . . . vertical and horizontal . . . all sizes.
GENERATOR VOLTAGE REGULATORS . . . for providing constant output voltage on generators of all sizes.
SYNCHRO-OPERATOR . . . for full automatic synchronizing of ac generators.
CONDENSERS . . . surface and jet types complete with condensate and circulating pumps and drives . . . air ejectors.
PUMPS . . . for every power plant service . . . complete with motor drives.
WATER CONDITIONING equipment, chemicals and service.

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POWER TRANSFORMERS . . . all sizes, including load-ratio control, regulating, phase-shifting, rectifier, furnace, and welding types.
DISTRIBUTION TRANSFORMERS . . . urban and rural types, network, subway, vault, non-inflammable, and dry-types.
INSTRUMENT, METERING TRANSFORMERS . . . complete line.
FEEDER VOLTAGE REGULATORS . . . for station, distribution and branch service.
SWITCHBOARDS to suit application.
SWITCHGEAR . . . vertical lift and horizontal drawout, metal-clad.
CIRCUIT BREAKERS . . . oil, magnetic and air blast types . . . outdoor and indoor . . . manual and automatic.
UNIT SUBSTATIONS . . . single-circuit, multi-circuit and load center types.

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RECTIFIERS . . . mercury arc power, with metal tanks, single and multiple anode . . . also permanently evacuated type.
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SYNCHRONOUS CONDENSERS . . . for power factor correction and improvement of system stability.

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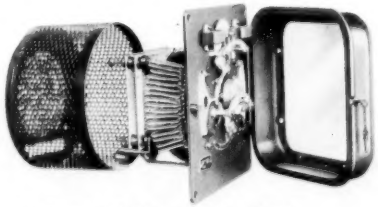
ELECTRIC MOTORS . . . synchronous, induction, direct current, ½ hp up to largest. Drip-proof, splash-proof, weather-protected, pipe or forced-ventilated TEFC and explosion-proof.
TEXROPE DRIVES, multiple V-belt . . . cast iron and pressed steel sheaves . . . variable speed . . . speed changers.
MOTOR CONTROL . . . standard and special for motors of all sizes above ½ hp.



Power Plant Voltage Control

In *Rocking Contact* voltage regulators, a small movement of the sector over a curved commutator covers the entire regulating range. No sluggish time-wasting relays. No vibrating or sliding contacts to wear out.

Type A Regulator — for ac generators, 125 kva at 257 rpm to 1750 kva at 3600 rpm.

Type B Regulator — for ac generators, 1000 kva at 257 rpm to 6250 kva at 3600 rpm.

Type C Regulator — for ac generators from 3125 kva at 257 rpm to 25,000 kva at 3600 rpm.
All have a guaranteed sensitivity of plus or minus 0.5%.

Motors for Power Plant Auxiliaries

Allis-Chalmers now offers a line of totally-enclosed fan-cooled induction and synchronous motors in ratings up to several thousand horsepower. These motors feature a heat transfer system utilizing a cooling jacket which consists of tubes compactly arranged in the yoke. Internal air circulates through this nest of tubes. Heat is transferred by conduction to the inside of the tubes and is then dissipated to the atmosphere by air from the external fan. Sizes 40 hp to 3000 hp. Other power plant motor designs from 1 to several thousand horsepower.

Rocking Contact, Synchro-Operator and Texrope are Allis-Chalmers trademarks.

COOPERATIVE ENGINEERING

Your A-C representative is an application specialist — ready and able to work with your staff or your consulting engineers to solve your processing problems. His recommendations are backed by Allis-Chalmers engineering departments . . . by complete research, testing and pilot plant facilities . . . by experience gained in solving thousands of equipment coordination problems. Each processing problem is given personal, expert attention. Engineers and technicians examine and evaluate your process to make *existing* as well as *new* equipment as productive and economical as possible.

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Because A-C builds many types and sizes in a given equipment line, recommendations are completely unbiased . . . dictated only by your specific needs.

Most important is the fact that Allis-Chalmers interest in your problem is continuous. Laboratory services, periodic equipment check-up, emergency parts service are yours for the life of the equipment.

Allis-Chalmers builds the following types of integrated equipment:

HEAVY	1	Crushers • Grinding Mills • Screens
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POWER	4	Generators • Condensers • Pumps • Transformers • Switchgear Substations • Motors • V-Belt Drives • Control
LIQUID HANDLING	5	A complete line of Centrifugal Pumps
AIR AND GAS HANDLING	6	Centrifugal Blowers • Axial Compressors

Allis-Chalmers also makes equipment for solvent extraction, electronic heating, metal detection, and inter-floor conveying.

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WRITE FOR LITERATURE

A 28-page insert, "Allis-Chalmers Equipment for the Process Industries," may be found in the Chemical Engineering Catalog. This insert is available in bulletin form (25C6177). Individual bulletins covering specific equipment lines also are yours for the asking.

mercial units enables pressures to be taken up to 150 psi.; the unit can also operate at negative (vacuum) pressures.

• Adjustments are provided for systems other than water and air. Most experimental models work on these but data therefrom can't always be applied to commercial systems. FR's unit will handle normal butane-isobutane, methyl cyclohexane-normal heptane, isoproypl alcohol-water, methyl ethyl ketone-secondary butyl alcohol and hexane-absorption oil systems, among others.

The idea is to uncover everything that can be brought to bear upon the improvement of commercial fractionation. Although FR isn't aiming to develop better equipment (e.g., bubble-cap trays), says Hudson, "it is inconceivable that they won't."

Budgets and Bounties: The results that FR is looking for are clues to the design of less expensive, more effective, reliable and flexible fractionating columns, or information that would permit presently operating columns to be revamped for greater capacity or separating efficiencies.

Already uncovered, one bit of information—that FR is currently checking out on its experimental unit—could lead to a 20% increase in capacity for standard fractionating columns. This could save stockholders the cost of a new column—that's roughly $250,000.

At the same time, the maximum cost to an FR stockholder is $20,000/year—less, Hudson figures, than a good research engineer's salary and maintenance for one year. In exchange, stockholders get five years' use of facilities and services calculated to cost $0.5-1 million, plus free use of any devices or techniques developed by FR.

At present, the schedule calls for dissolution of Fractionation Research and distribution of its assets in 1957; however, Hudson points out, since the equipment will have been paid for by then, stockholders may wish to extend the corporation's life. The idea of creating a company to carry out cooperative, noncompetitive research is not unique, says Hudson; there is a similar setup composed of 40 oil firms, called Drilling Research, now about five years old. But the idea lays open numerous projects for exploitation; corrosion, for example, could prove a suitable subject, says Hudson, for some future five-year plan. The process industry is rife with common problems awaiting cooperative research.

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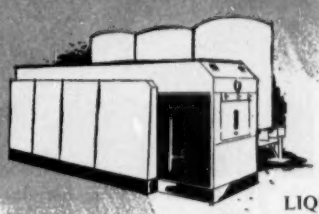

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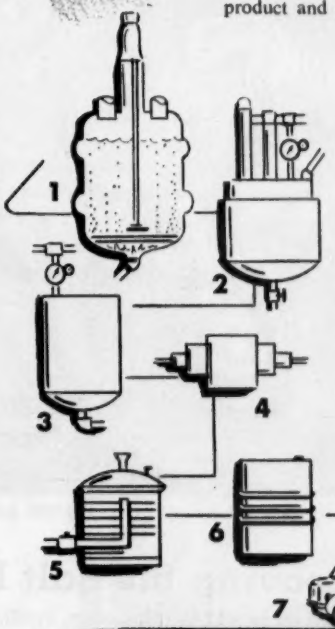

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CO_2 Sparging Cuts Cooking Time ⅓!
• ***Intensifies agitation.*** In actual tests, CO_2 sparging, added to mechanical agitation, reduced cooking time from 720 to 235 minutes.
• ***Retards oxidation.*** CO_2 passing through reaction mixture inerts it...keeps colors light, constant.
• ***Reduces reaction time.*** CO_2 carries off water vapor, allows mixture to reach higher temperatures.

2 THINNING
CO_2 in thinning tank retards oxidation, provides a fireproof "blanket."

3 STORAGE
CO_2 "blanket" in storage tank prevents "skinning."

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Under pressure from the LIQUIFLOW System, CO_2 is a safe, efficient transfer medium. Also prevents "skinning" in pipes and pumps.

5 FILTRATION
CO_2 used to blow out filters recovers the oil, reduces cleaning time and frequency of cleanings.

6 PACKAGING
Purging shipping containers with CO_2 prevents "skinning" while material cools.

7 TRANSPORT
Purging tank trucks with CO_2 prevents "skinning"—eliminates costly cleanouts.

* Diagram above shows results of tests conducted in the Resin Materials Application Research Laboratories of the MONSANTO CHEMICAL COMPANY.

FREE MANUAL "The Uses of CO_2 In Paint, Varnish and Other Alkyd-Type Resin Manufacturing." Mail the coupon for your free copy.

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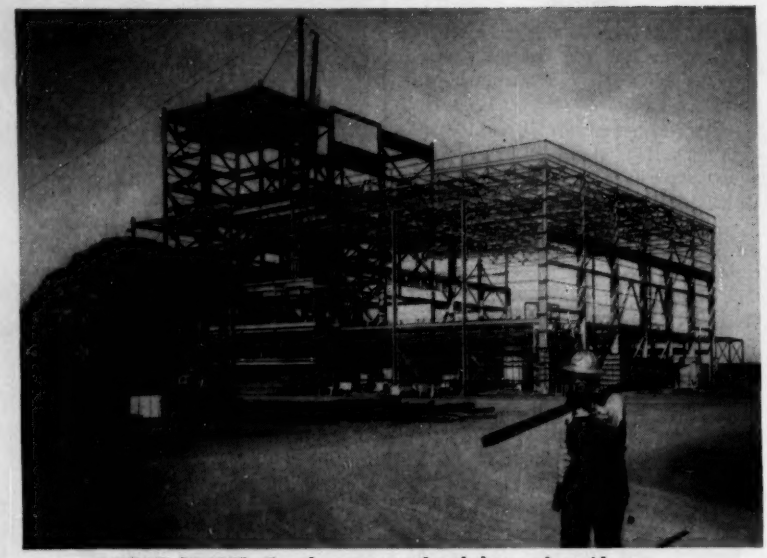


PG&E PLANT: For the present, the skeleton of an idea . . .

. . . for the future, 144,000 gal./day of fresh water from the sea.

Leaving the Salt Behind

Well on its way to completion, Pacific Gas & Electric's $44-million Morro Bay (Calif.) steam-electric generating plant will operate on water from the sea; evaporators will take out boiler feed water, leave briny residue behind. The first of two 150,000-kw. units is scheduled to go into operation early next year, with the second to follow sometime in 1956.

The evaporating system, designed by engineers of PG&E and the Bechtel Corp., is the first industrial application of sea water distillation in the U.S. Both of Morro Bay's giant boilers will have their own triple-effect evaporator, each to supply 72,000 gal. of fresh water per day.

Condensate from the evaporators will contain less than 50 ppm. of the original 36,000 ppm. of solids in the sea water. Further purification by redistillation in the station's make-up evaporator will reduce solids to about 1 ppm. before the water enters the main boiler feed water system. From every 150 gal. of raw sea water pumped into the system, PG&E figures to take out approximately 50 gal. of fresh water.

Times Three: The principle behind multiple-effect evaporation is, of course, essentially simple: a series of evaporator tanks are connected so that vapor from one tank acts as the heat-

to fully effective heat input in minutes—

that's the story of the...

Blaw-Knox radiant furnace

The Blaw-Knox Radiant Furnace for batch operation has such low heat capacity that it can be brought to fully effective operation in five minutes or less. Cut the fuel supply and it is black in one to two minutes.

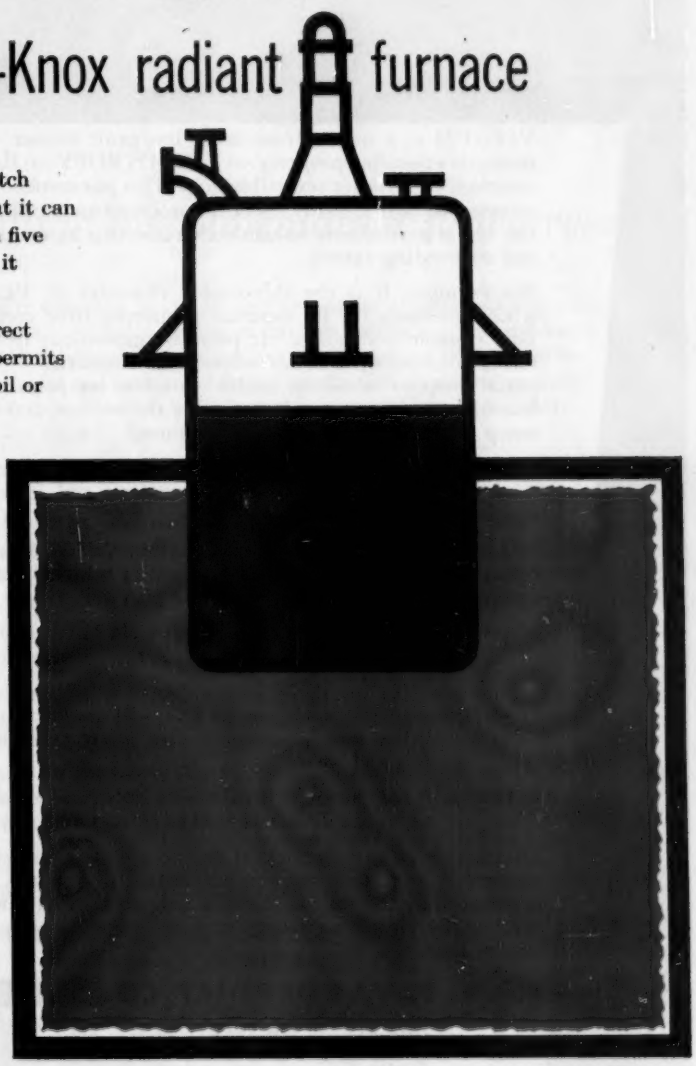
The nearly instantaneous response to direct instrument regulation of the fuel input permits close temperature control of a batch of oil or resin, even in an exothermic stage. Successive cooking curves on different days are smooth and identical.

The basic design of the Blaw-Knox Radiant Furnace is a light stainless steel shell surrounded by high temperature, light weight insulating material.

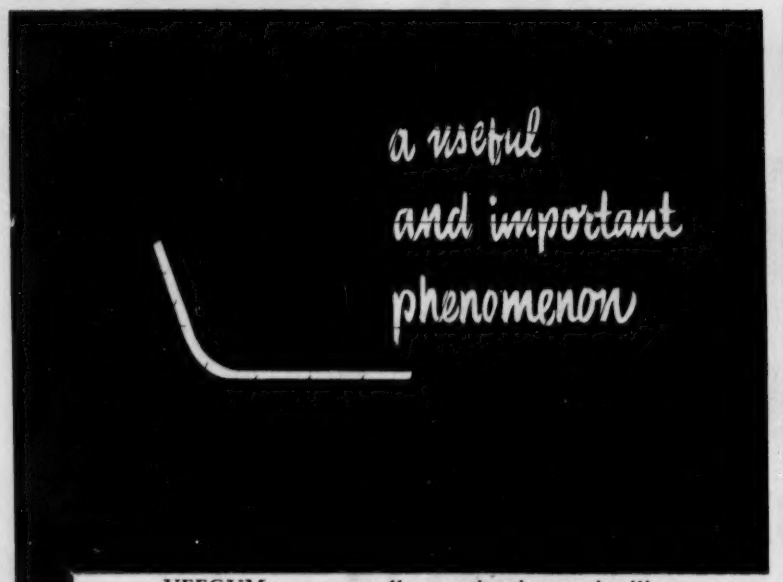
Approximately 75 percent of the heat to the batch is supplied by radiation from furnace walls arranged to eliminate local hot spots.

Field reports of normal plant operation indicate fuel savings close to 50 percent over conventional, brick-lined, direct-fired furnaces.

Write for complete information on the application of this low heat capacity furnace to direct-fired processes.



BLAW-KNOX COMPANY Chemical Plants Division /Pittsburgh 22, Pennsylvania
Tulsa 1, Oklahoma /Chicago 1, Illinois



VEEGUM — a naturally-occuring inorganic silicate — possesses this peculiar property — THIXOTROPY — the characteristic of forming reversible gels. This phenomenon plays an essential part in many chemical processes and applications, but it is a particularly valuable characteristic in emulsifying and suspending agents.

For example, it is the thixotropic character of VEEGUM which accounts for its superior properties over commonly used organic emulsifiers. It permits suspensions of higher solids content with lower suspension viscosities — It imparts superior stability under variable temperature and humidity conditions — It improves the texture and consistency of the materials in which it is used.

Specific tests* of this kind conducted in our laboratories show results we know will be of interest and importance to chemists in this field.

In addition to its thixotropic properties, VEEGUM also exhibits other advantageous characteristics which give it an exceptionally wide application.

* **VEEGUM** is an effective agent in dispersing hydrophobic or colloidal materials without the foam of lowered surface tension.

* **VEEGUM** dispersions as low as 1% will permanently stabilize emulsions containing many types of oils, fats and waxes.

* **VEEGUM** is compatible with alcohols, polygycols, and other organic solvents as well as certain electrolytes.

Thixotropic **VEEGUM** is purified colloidal magnesium silicate, non-greasy, non-toxic and non-irritating. It is opaque, white, odorless and tasteless. It is easily prepared in aqueous dispersions by simple agitation with or without the application of heat.

R. T. VANDERBILT CO.
SPECIALTIES DEPARTMENT
230 PARK AVENUE, NEW YORK 17, N. Y.

Please send ☐ VEEGUM Bulletin C122 ☐ sample of VEEGUM
☐ information on using VEEGUM for:

(state application)

NAME

POSITION
(Please attach to, or write on, your company letterhead)

PRODUCTION . . . .

ing medium for the next tank. In theory the amount of evaporation increases in direct proportion to the number of effects or evaporator tanks.

In actual practice, the operation is far from simple: at Morro Bay, PG&E will pump raw salt water into the first of three evaporator tanks where steam from the plant's regular steam system will pass through 290 one-inch evaporator tubes, vaporize the first portion of salt water. The vaporized salt water (steam), drawn off the top of the evaporator tank, will then pass through the second set of evaporator tubes, vaporize more of the raw salt water. Similarly, vapor from the second effect will vaporize additional water in the third effect.

Salt-water steam from the final (third) effect together with vapor from the first two effects will be piped to a make-up evaporator and redistilled in order to lower solid impurities. After it has been reconverted into steam, it will then serve to power the plant's turbine generators.

The unevaporated sea water – its salinity concentrated to 150% of normal–will pass from the final evaporator into the plant's discharge system. In order to minimize crusting of salt in equipment, PG&E will add a liquid cornstarch-disodium phosphate boiler compound to the first effect, maintain (by vacuum) a progressive depression of the boiling point in successive effects.

To minimize corrosion, an equipment fabricator, Lummus Co. (Honesdale, Pa.), is now making these evaporator tanks of a copper-bearing steel, with steam tubing of a copper-nickel alloy in the first tank and of an aluminum-brass compound in the other two.

Primary considerations influencing the decision to use evaporators were conservation of local fresh-water supply and dependability. After exhaustive inquiries as to other possible sources, PG&E concluded that sea water is "the most advantageous of all sources considered."

Prior to this time, multiple-effect evaporation had not been regarded as a very economical means of getting fresh water from the sea (*CW, June 12, p. 38*). The price tag on each triple-effect evaporator is $200,000. Cost of the fresh water by this method has been estimated by experts as somewhere between $1.50-4/thousand gal. At these prices, there is no indication that salt-water distillation will become a trend. But it could be a boon to plants in locations where the premium on a reliable fresh-water supply will foot the bill.

modernizing?

give new equipment the instrumentation it deserves

WHEN you're planning to install new process equipment, plan to take advantage of the full potential of modern methods of measurement and control. It's the sure way to get top value for your modernization investment . . . for the improvements in production economy, quality and versatility possible with today's new process equipment depend increasingly on control instrumentation.

Here are some specific suggestions for your own modernization plans:

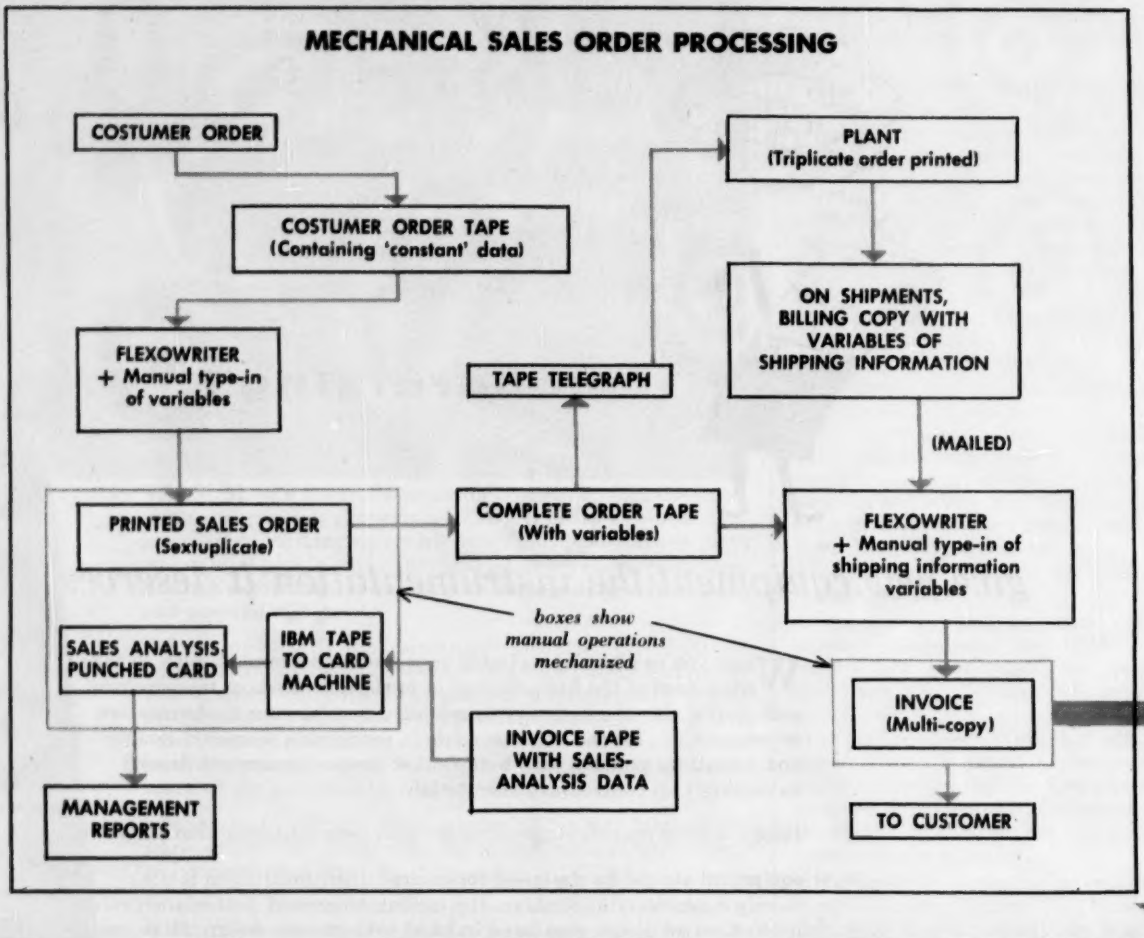
New equipment should be designed for control. Instrumentation is not merely a necessary appendage. It's a vital, integrated part of the process itself. Control design goes hand in hand with process design. Honeywell's experienced application engineers will be glad to cooperate with your own staff or your consulting firm, to recommend ways to obtain the full benefit of modern instrumentation.

Each instrument should fit its function. This may seem obvious—but all too often, instrumentation has been stretched or squeezed to fit the application. In Honeywell's exceptionally wide line, you'll find instrumentation with exactly the right performance . . . at the right cost . . . for your process.

A talk with your nearby Honeywell field engineer will give you a detailed picture of what instrumentation can mean in your modernization program. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.

MINNEAPOLIS **Honeywell**
BROWN INSTRUMENTS
First in Controls

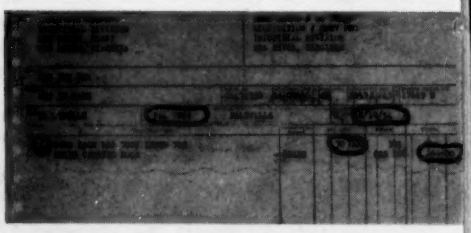


Punch Tape Cuts Red Tape

Upwards of 80% of manual sales-order manipulation is eliminated as Mathieson initiates "integrated data processing."

Mechanized from order writing to sales analysis, IDP trims costs, speeds handling, and boosts accuracy.

Invariable information, processed with tape-perforating typewriters, and IBM machines, team together to turn the trick.



SHORTCUT INVOICING: Mechanical (except circled parts), it trims time, errors.

One of the last remaining strongholds of untamed costs and manual human endeavor – office paper work – was stormed again this week under the forward march of mechanization. Unveiled to CW's camera at Mathieson Chemical Corp's Baltimore headquarters: the first industrial application of complete "integrated data processing" to sales-order handling.

With IDP–a cost-slashing hook-up of Flexowriters, telegraphic equipment and IBM machines–Mathieson now:

- Writes 80-90% of its industrial sales-order data automatically, simultaneously transmits it to the plant.
- Transcribes automatically a like percentage of its invoicing.
- Performs mechanically, with a minimum of manual aid, tabulating and sales-analysis chores.

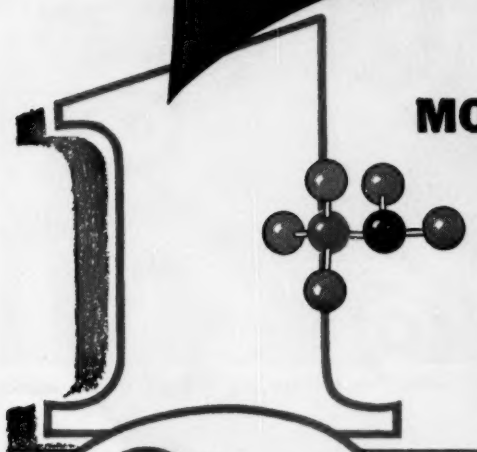
Actually, Flexowriters have been used for some time in letter duplications and for specific paper work processing jobs. But the Mathieson installation is believed to be the first to process sales orders mechanically from initial writing though to sales analysis.

And, asserts the company, the new system substantially decreases office costs, improves the method-efficiency of achieving accuracy and, with some aid from a communication centralization, markedly soups up order-handling and sales-analysis work.

Next to hiking sales, there's nothing most chemical companies would rather do than pare overhead. Not too long ago, Robert S. Thiem, administrative assistant in Industrial Chemicals, viewed a Baltimore showing of Flexowriter equipment, came away with a

CSC LOW-COST INTERMEDIATES IN TANK-CAR QUANTITIES

This versatile trio represents the most economical source of the amine group because of their low equivalent weights and moderate prices. Marketed by CSC in both anhydrous and aqueous forms, they are available for shipment in large-volume quantities (tank cars) as well as in drums and smaller containers. Write for latest Technical Data Sheet. Industrial Chemicals Sales Dept., Commercial Solvents Corporation, 260 Madison Avenue, New York 16, N. Y.



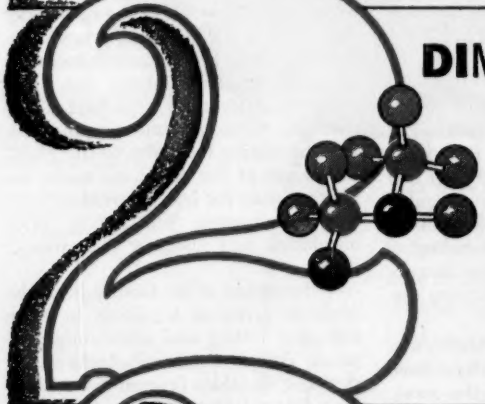
MONOMETHYLAMINE CH_3NH_2

Uses

Manufacture of amide and sulfonated amide-type detergents and surfactants. Synthesis of caffeine, aminophylline and desoxyephedrine. Manufacture of photographic chemicals, the explosive tetryl, amide-type plasticizers, ion-exchange resins, corrosion inhibitors and paint removers.

Properties

Molecular Weight	31.06	
Boiling Point at 760mm, °C	– 6.79	
Flash Point, Tag Open Cup, °F	34	(30% sol)
Density at 20°C	0.912	(30% sol)
Weight per U.S. Gallon at 68°F, lbs.	7.6	(30% sol)



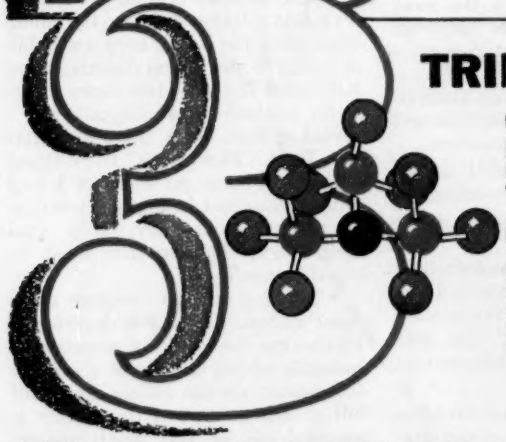
DIMETHYLAMINE $(CH_3)_2NH$

Uses

Raw material in manufacture of thiuram sulfide-type vulcanization accelerators and of dimethyldithiocarbamic acid salts used as fungicides. Neutralizing and solubilizing agent in preparation of concentrated solutions of 2,4-D salts. Manufacture of anti-malarials.

Properties

Molecular Weight	45.08	
Boiling Point at 760mm, °C	6.88	
Flash Point, Tag Open Cup, °F	54	(25% sol)
Density at 20°C	0.921	(25% sol)
Weight per U.S. Gallon at 68°F, lbs.	7.7	(25% sol)



TRIMETHYLAMINE $(CH_3)_3N$

Uses

Preparation of long-chain quaternary ammonium compounds used as softeners, lubricants and waterproofing agents for textiles. Used with benzoyl peroxide to "set" methacrylate resins. Synthesis of cationic surface-active agents.

Properties

Molecular Weight	59.11	
Boiling Point at 760mm, °C	2.87	
Flash Point, Tag Open Cup, °F	38	(25% sol)
Density at 20°C	0.913	(25% sol)
Weight per U.S. Gallon at 68°F, lbs.	7.6	(25% sol)

COMMERCIAL SOLVENTS
CORPORATION

CSC INDUSTRIAL CHEMICALS

many signs of the times are seen through a MICROSCOPE!

For example you see above a photomicrograph of microcrystalline wax. This wax gets its name from the minute crystalline structure which, under the microscope, contrasts greatly with the large, widely separated crystals of paraffin.

Bareco microcrystalline waxes have long been leaders in their field. Now in use in literally thousands of different wax formulas they have received the widespread applause of scientists in the wax-using industries throughout the world. Bareco waxes are in constant demand, because formulators have learned that "Wax is Bareco's business . . . their *only* business"—and this specialization pays off in more reliable, more uniform wax protection.

Be Square 190/195 melting point
Be Square 180/185 melting point
Be Square 170/175 melting point
Starwax 180 minimum melting point
Cerawald 155 minimum melting point
Ceratak 155, 165 minimum melting point
Victory 155, 165 minimum melting point
Petronauba emulsifiable petroleum wax for polish formulations.

Write for samples, specifications, and prices

BARECO OIL CO.
BOX 2009 • TULSA, OKLA.

COST CHOPPERS: Edward Clayton, Robert Thiem and William Stevens inspect their "axe"—punch-holed tape.

vision of lower costs through lessened manual typing of orders. But by the time the system hits high gear, its punch-holed tape will have crept into invoicing and sales analysis as well.

Typing and Taping: Main cog of integrated data processing is the Flexowriter. When a message is typed out on the machine, it produces a regular printed script copy and concurrently records the data by punch-holing a paper tape. Analogously, the instrument can print the message from the tape.

Like most companies, Mathieson has many customers repeatedly ordering the same chemical for the same plant. Thus a good part of the order information stays constant. Some invariables: customer name, plant location, shipment route, terms, description, shipping notice specifications and in some cases, special instructions.

Here's how Mathieson combines instruments and invariables to bring efficiency and the machine age to sales-order routine:

• For its 6,000 customers for whom it was practical, the firm recorded this information on an Order Preparation Card with a Flexowriter, thus perforating a master, constant-information order tape.

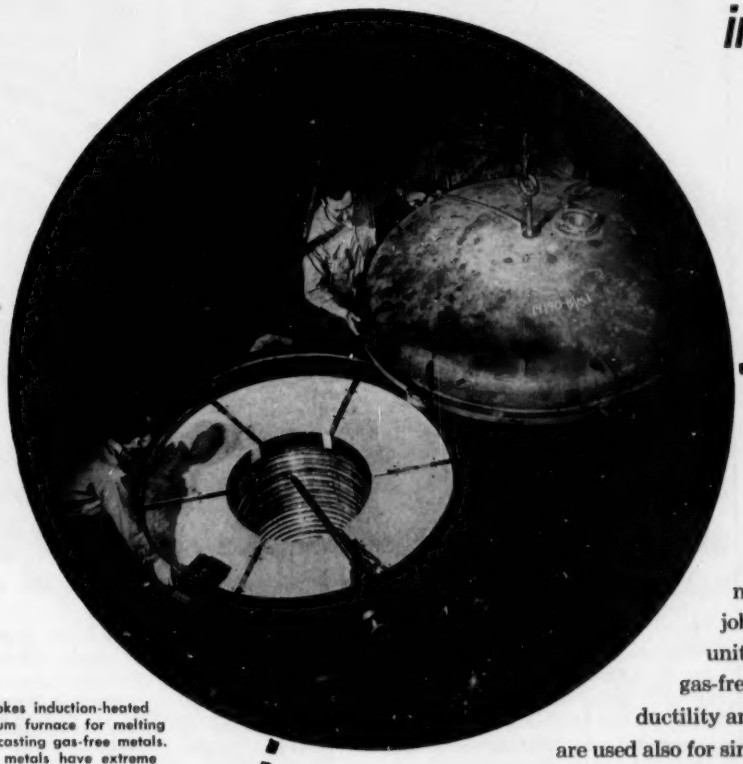
• When a salesman's successful, the right card-and-tape is yanked, the tape fed into the Flexowriter. This automatically reproduces the invariable data on the order. Variable material, such as the particular number of the order, quantity and "when wanted" are added manually. As the sales order rolls around the carriage, a new, second tape with both constant and variable information ribbons out. This complete sales-order tape next winds through Western Union equipment, thereby wiring the order to the plant. Six copies of the order are made, including ones for billing, product control (production scheduling, price checking), and customer acknowledgment.

• Receivers at the factory print the wired-in order in triplicate to serve shipping, billing and scheduling purposes. The plant manually tacks on the shipping variables (car numbers, shipping date, package data), to the billing copy, posts the billing copy and a bill of lading to the billing department in Baltimore. The procedure varies slightly for multicar orders shipped over a period of time. Here, the Transportation Dept. "Flexowrites" the original lading bill, turns out a master lading tape. Subsequent lading bills are thus inscribed automatically; only total weight and shipping date need be typed manually.

• Hauling out the complete sales-order ribbon, the billing department Flexowrites the invoice automatically, manually adding only the new variable information on the billing copy and bill of lading. And as the invoice is pounded out at 100 words/minute, the Flexowriter mechanically clicks off a new tape—with all the facts for sales analysis and tabulating.

• Whirled through an IBM tape-to-card machine, the data are trans-

Need Vacuum-Melted Metals in 1000-pound Quantities?



A Stokes induction-heated vacuum furnace for melting and casting gas-free metals. Such metals have extreme purity, high ductility, great impact and rupture strength, improved creep resistance and exceptional performance qualities.

Stokes is *building* practical vacuum furnaces to supply that need . . . *designing* for 2000-pound jobs . . . *planning* for 5000-pound units . . . for melting and casting gas-free metals of extreme purity, high ductility and great strength. These furnaces are used also for sintering, annealing and degassing.

You can have Stokes vacuum furnaces for top or bottom pouring, for single or multiple ingots, for centrifugal castings. We build tilting type induction-heated melting furnaces of 10 to 1000 pounds capacity; movable retort resistance-heated furnaces for degassing and annealing in 10, 20 and 30-inch retort sizes; resistance-heated furnaces with removable heat source or with bell-type retort; two-zone furnaces with movable boat, and others.

We supply complete, integrated "package" units engineered completely and specifically to meet the particular need for vacuum pumping capacity, heating input and any mechanical actuation required to control operations in the vacuum chamber.

Most important . . . we bring to every vacuum furnace problem the value of 40 years' *practical* experience in building vacuum equipment and guiding its installation and adjustment to efficient operation in the field.

F. J. Stokes Machine Company, Philadelphia 20, Pa.

STOKES

STOKES MAKES: High Vacuum Equipment, Vacuum Pumps and Gages / Industrial Tabletting, Powder Metal and Plastics Molding Presses / Pharmaceutical Equipment

MAIL COUPON BELOW

The BETTER the ODOR the BIGGER the SALES!

DON'T TURN UP YOUR NOSE AT BAD ODORS....

Instead . . . DO something about them! Bad industrial odors . . . bad product odors . . . these can be overcome, in most cases, by the proper use of suitably selected aromatics. And cheaply, too! If you have such a problem, chances are we can offer you an effective solution based upon countless problems similar to yours successfully handled by our Technical Laboratories for other accounts. It will cost you nothing to investigate. So, submit us your odor problem. If we can effect an improvement, you will benefit. Write us . . . or use coupon below.

PLEASE FILL IN AND MAIL

FRITZSCHE BROTHERS, Inc.
76 NINTH AVE., NEW YORK 11, N. Y.
We are interested in ☐ PERFUMES ☐ ODOR NEUTRALIZERS for use in the manufacture of products checked below. What do you recommend?
☐ ADHESIVES ☐ FINISHES ☐ INK
☐ LEATHER ☐ PAINT ☐ PLASTICS
☐ PETROLEUM PRODUCTS
☐ POLISHES ☐ RUBBER ☐ SOLVENTS
☐ SPRAYS ☐ TEXTILE CHEMICALS
☐ OTHERS: _____

(Note: Please send accompanying letter giving details of your particular problem.)

COMPANY: _____
ADDRESS: _____
CITY: _____ STATE: _____
ATTENTION: _____
TITLE: _____

FRITZSCHE Brothers, Inc.
Established 1871
PORT AUTHORITY BUILDING
76 NINTH AVENUE, NEW YORK 11, N. Y.

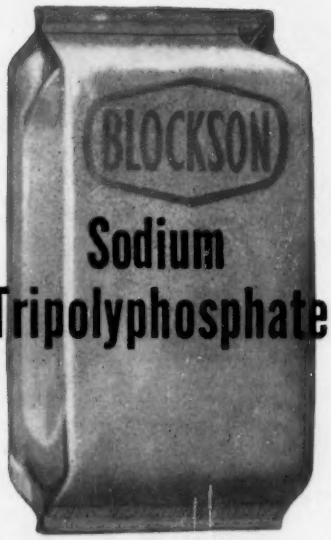
TYPING FROM TAPE: Flexowriter prepares most of the order, girl adds rest.

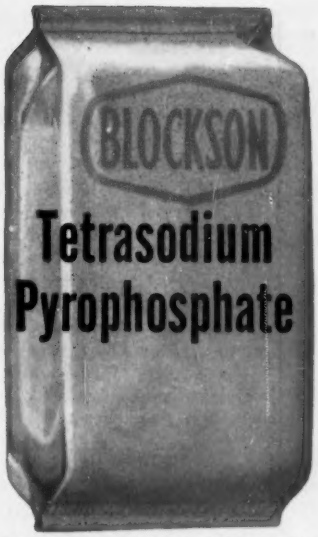
ferred in the tabulating section to punched-hole cards. Mechanical sorting then deals such typical sales assay data as territorial, geographical, and industry-use breakdowns, captive consumption, and total product volume vended by plant or entire company.

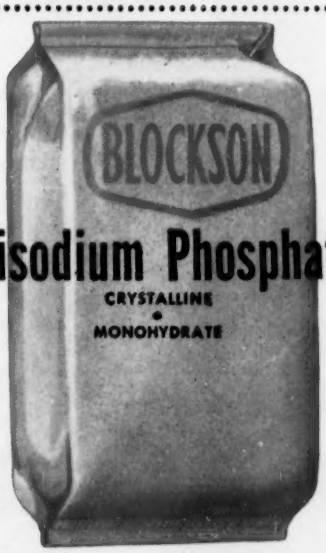
Bonus Benefits: Into every nook the perforated band reaches, it punches out solid time-snipping, money-saving advantages. And, contends the company, it's even boosted morale. Advantage by advantage, this is how the "machine-look" benefits Mathieson's order processing:

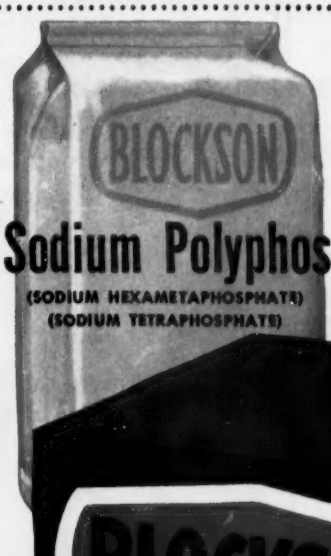
• Accuracy. Vital at every step, it was formerly attained in sales analysis, for example, only through extensive, expensive checking. Files had to be drawn, data coded, then key-punched into IBM cards. Careful costly scrutiny of this laborious manual operation was necessary to avoid creep-in error. But now its all control-engineered and opportunity for error has plummeted 70%. Invoicing error possibility has slumped a whopping 95%. Vanquished too, by mechanical order writing, are costly customer-ruffling mistakes in addressing.

LAST REEL: Invoice tape data is recorded on punch-hole cards for sales analysis.









Sodium Polyphos is Blockson's brand name for a water soluble Glassy Sodium Phosphate with the desirable characteristics of Sodium Hexametaphosphate and Sodium Tetraphosphate.

ALSO MAJOR PRODUCERS OF:

SODIUM ACID PYROPHOSPHATE

CHLORINATED TRISODIUM PHOSPHATE

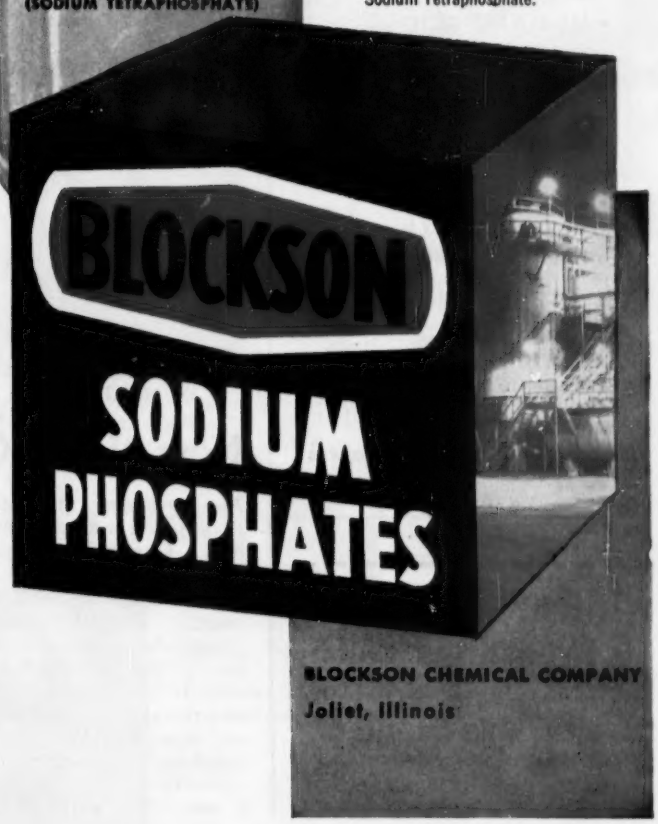
DISODIUM PHOSPHATE
ANHYDROUS • CRYSTALLINE

MONOSODIUM PHOSPHATE
ANHYDROUS • MONOHYDRATE

SODIUM FLUORIDE

SODIUM SILICOFLUORIDE

HYGRADE FERTILIZER



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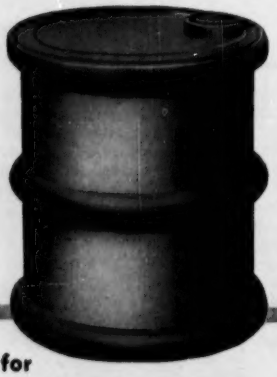
SAFE AND EASY TO HANDLE!
NO METAL
NO BREAKAGE



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Tare Weight—34 lbs.
13 gallon capacity

★

Made with
Natural, Neoprene,
Butyl or other Synthetic
Rubber Linings

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Threaded or Stopper type closures

GENERAL

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MECHANICAL GOODS DIVISION
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• Time. Beating away twice as fast as a good typist, the Flexowriter halves order preparation and invoice typing time. And changelessly recording the facts onto tape, it whacks 80% off clerking and verifying time.

Other economies: separate keyboarding of the order to the plant is eliminated, shaving 50% off the sending time. The Flexowriter hook-up, too, smooths handling of peak load transmission. Generally, the new system expedites all process routine.

• Savings. Introduction of the mechanical method, asserts Thiem, saves the salary of several clerks. But this is not all. For, in Order Writing, the same staff throughputs much additional work. Now, it places on "tape" much of the information previously done by Billing and Tabulating. Overtime too, no longer gnaws the budget.

• Production. Without boosting its numbers, the same staff could handle a fair-size work increase. In Tabulating, the department now not only places sales analyses on the desk of management days sooner, but also can readily whip up additional reports. Morale gets its lift in the bypassing of tedious typing and formerly messy order duplication.

Evolution: Master-planned as it may appear, the innovation and its expense-chipping pluses weren't spawned overnight. Originally, only order-writing was scheduled for the punched-hole ribbon. But its potentials, economy and ease of accuracy attainment, were too promising to be bypassed by Billing and Tabulating. Teaming together, William A. Stevens, Billing Manager, Edward F. Clayton, IBM tabulating boss, and Thiem set out to mechanize paper work, streamline cost. Aiding them: their 90-odd years of Mathieson know-how, technical service men from Commercial Controls Corp., Western Union and Standard Register.

Although the switch-over went smoothly, and most problems were

MULTIBRANCH INTERCOM: It handles heavy loads for less.

New Nerve Center

Also revamped at Mathieson (*see story, p. 56*) is its communication system. Like most of the IDP, it "evolved" during the switch to mechanization and was not, at the outset, originally contemplated. Shown above: the new nerve center joining the Baltimore headquarters with 31 plant and regional branches on a private wire. Heretofore, Mathieson depended upon leased line and telephone communication.

The new message center stems from a comprehensive study of previous communication costs. In establishing it, the company gained these assets:

• Improved communication. Peak loads are easily transmitted.

• Economy. The installation offers a refile feature and allows vast message step-up without increased cost. Example of the refile "plus": Mathieson's Squibb Division can wire the Pacific coast, using the internal system to its farthest western point. Cost then would be only for sending from the end of the private wire to the Coast.

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LOW-COST —Made by modern process that permits low selling price.

PERMANENT —Stable and non-yellowing—unaffected by alkalies and salts.

WATERPROOF —Piccolyte resins are unaffected by water or moisture.

MANY GRADES —Standard and special grades in melting points from 10° C to 135° C.

Physical and Chemical Properties—Standard Grades

Grade Number	*Melting Point ± 3°C*
S-10	10° C
S-25	25° C
S-40	40° C
S-55	55° C
S-70	70° C
S-85	85° C
S-100	100° C
S-115	115° C
S-125	125° C
S-135	135° C

The properties of PICCOLYTE RESINS are:

COMPOSITION—Composed essentially of polymers of pinenes, predominately beta pinene.

ACID RESISTANCE—Inert to dilute acids.

ALKALI RESISTANCE—Unattacked by 10% solutions of alkalies.

SALT RESISTANCE—Unattacked by salt solutions of varying pH.

HEAT RESISTANCE—When held at 600° F for six hours no darkening in color was observed.

SAPONIFICATION—Saponification number approximately zero.

ACIDITY—A neutral resin, acid number approximately zero.

SPECIFIC GRAVITY—Has low specific gravity, varying with melting point between 0.98 and 1.00.

THERMOPLASTICITY—A readily thermoplastic resin.

MELTING POINTS—Various melting points available from 10° C to 135° C on the Ball and Ring softening point method. (Tolerance, 3° C).

COLOR—A 50% solution in mineral spirits approximately color 5 on Gardner 1933 scale.

SOLUBILITY—Completely soluble in aliphatic hydrocarbons.

ASH—Less than 0.1%.

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minor, one big question cropped up: What information should be included on the order to provide sales analysis with the requisite data?

Solving it entailed a thorough study of what sales analysis needed plus a bit of "trial-and-error" experimentation. And, to hit maximum efficiency, repositioning of data on some of the paper forms was required. Here, manual fill-ins were grouped, not interspersed with tape-activated typing.

Morale sag, one problem often accompanying job elimination, never materialized. Those displaced by machines were all transferred to other jobs. (At the outset, of course, the order writing mechanization meant overtime for the section personnel. Transfer of 6,000 records to tape, while not a real problem, was a burdensome chore, needed overtime hours for completion in a reasonable period.)

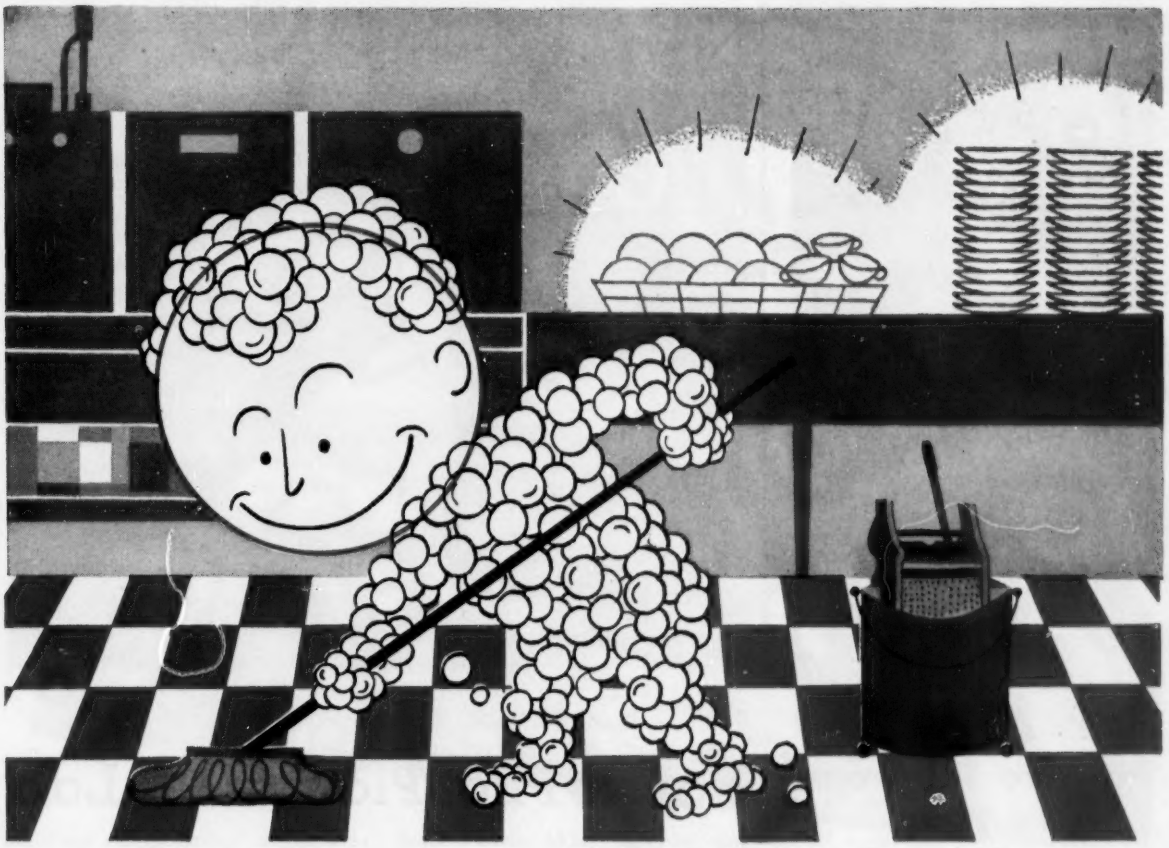
Payoff: The cost of gadgeting the sales-order routine is naturally difficult to total. Most of its cost is for the Flexowriters themselves ($2,600 each). Mathieson's case may not be wholly typical; much auxiliary equipment (IBM machines) was already available. Thiem predicts the mechanization will pay for itself before the end of 12 months.

It's evident that integrated data processing at Mathieson is significant. Already, several companies have been impressed with the semiautomatic system after watching it work in Baltimore. And Mathieson itself, satisfied that IDP has "fully lived up to all expectations," has further plans for the system, will extend it to its recently acquired antifreeze business.

•

For your reference files:

- The Truth about Boric Acid and Borated Talcs—results of studies by the Food & Drug Administration on boric acid and boric talc toxicities. Pacific Coast Borax Co., New York.
- Synthetic Resin Coatings—illustrated brochure of applications of vinyl, neoprene, silicone, saran and other coatings. Protective Coatings Div., Metaweld, Inc.
- Getting the Most from Your Traffic Manager—outline of operations, cost, productivity, and position of traffic management. School of Business, Indiana University, Bloomington, Ind.
- State Industrial Directories—lists of state industrial directories prepared by chambers of commerce, state commissions, universities, and research publishers, 25¢ Library, U. S. Chamber of Commerce, Washington 6, D. C.



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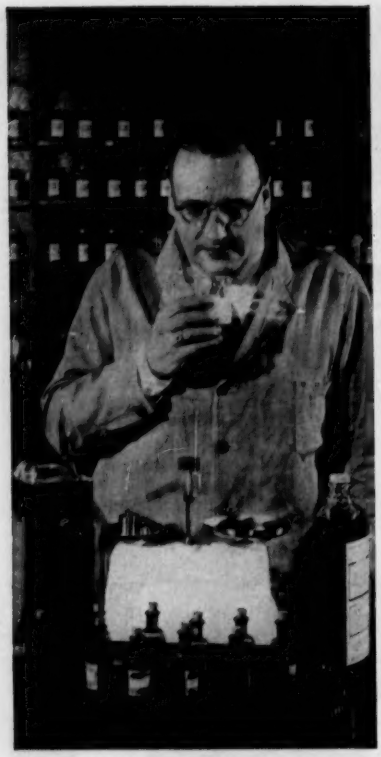

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RESEARCH . . . .

ESSO'S STEWART: Results are writing the book on . . .

How to Pilot-Plant in the Lab

You probably could save a small fortune on process development by simply eliminating the pilot plant. The problem is to accomplish the amputation at no technological cost to research and production. Not only is it possible; it's being done right now at the Linden (N.J.) laboratories of Standard Oil Development Co. This week, Esso's pioneering effort is being watched with avid eyes by a widening circle of cost-conscious research and development men.

Clutching their interest is the bold practice of scaling a process up to volume production on the strength of laboratory data.

Net results of these unconventional tactics are savings estimated to be in the magnitude of thousands of dollars a day. It costs possibly $50-100/day, all told, to keep a lab setup. That's a far cry from the $1,000 or $1,500 required by many pilot operations. And it takes a lot less time to set things up and get data on a lab scale. Lab setups, moreover, completely do away with pilot-plant scheduling and maintenance headaches.

Generally true for the whole range of chemical process industries, these potential advantages loom large in the petroleum business, where pilot plants will often deliver at the rate of 100 bbls./day on a continuous basis. They're big, expensive to build, and expensive to operate. So it's not difficult to see why petroleum people are taking the lead in bypassing the pilot plant.

Utilizing bench-scale apparatus that operates continuously and automatically at a feed rate of ½ to approximately 5 liters/hour of feed stock, Esso researchers have succeeded in converting vague speculation into concrete reality.

One problem tackled in the laboratory was the design of a hydroformer fractionater section. Distillation equipment for the plant in question was designed to produce a certain volume-fraction of a given octane number. It was necessary to determine experimentally whether the unit would deliver according to specifications.

Less than one month was needed to do the job, produce fractions for engine tests. Once an unquestioned pilot-plant task, this type of operation is now considered by Esso research men to be a reasonably routine bench operation. Because of the presence of flammable hydrocarbons, an operator was needed on each shift. But in other cases, similar units operate untended without difficulty during the night.

Another happy experience for Esso was the culmination of lab studies needed to confirm design data for the selective extraction (with phenol) of

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DATA

Solids — 55%

pH — 4-5

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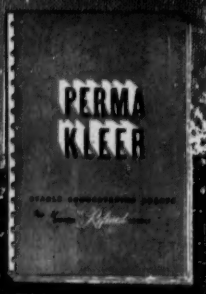

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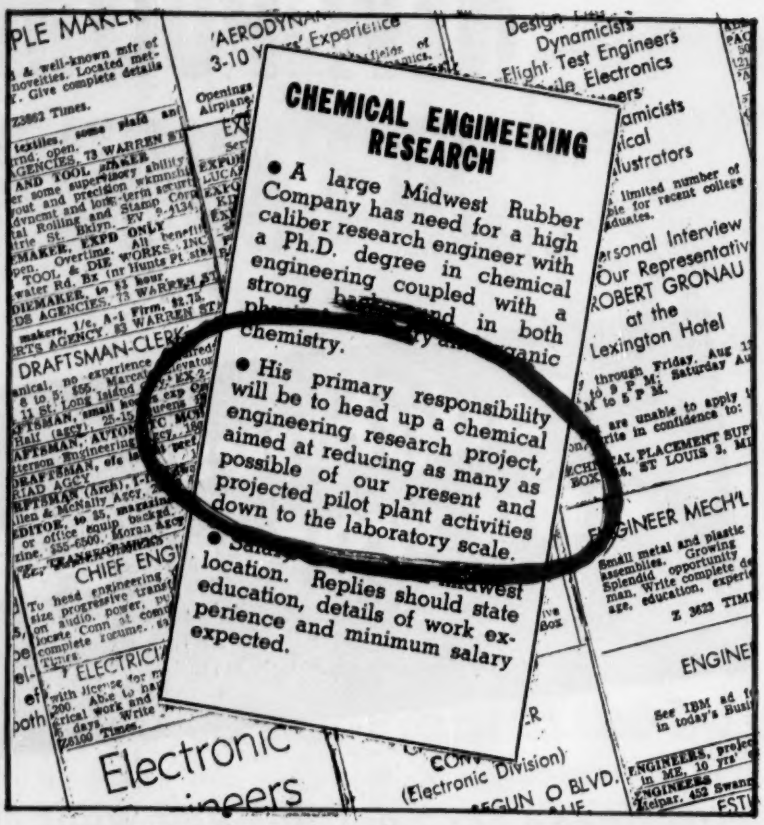
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Once again, the mission was completed with a bench-scale setup, requiring just one operator. This lab unit pointed up the need for a revised design, was also useful in determining the rate, type and source of sludge formation encountered in the plant.

In a third laboratory setup, researchers were able to evaluate the effect of distillation on the color-forming (e.g., in esterification) tendencies of a high-boiling Oxo reaction alcohol. Fruits of this labor were new and improved operation sequences for the production of high-quality, low color-producing alcohols.

A Common Denominator: Closer to conventional chemical reaction work are pilot studies of borate ester interchange and acetal hydrolysis, both of which were successfully carried out in laboratory apparatus. All of the projects, however, have a common denominator: a strong flavor of distillation and extraction.

And, in a small way, that's a measure of the scope and foundations of the movement away from the pilot plant. Petroleum researchers are on solid ground with distillations and separations of all kinds. They have the theory, know-how and—what's equally important—the confidence to scale such a lab process up to commercial plant proportions.

Esso research group leader Joseph Stewart, a key figure in this work, frankly concedes that the idea can only be applied in familiar areas of operation. "You might do it in thermal cracking or ammonia synthesis, for instance, with little hesitation," he explains. "But you wouldn't dare take a chance on a brand-new process that means a plant investment of $10 million."

Improving the Odds: It comes down to a simple case of having to be on familiar ground; but—as Stewart points out—there's getting to be more and more familiar ground. Each new basic discovery in engineering substantially improves the odds on directly converting lab results to practice.

Today, for example, most engineers would have little trouble with operations like heat transfer, fluid and solid flow. Mixing, on the other hand, would be expected to cause difficulty because of a marked lack of fundamental theoretical information in this area.

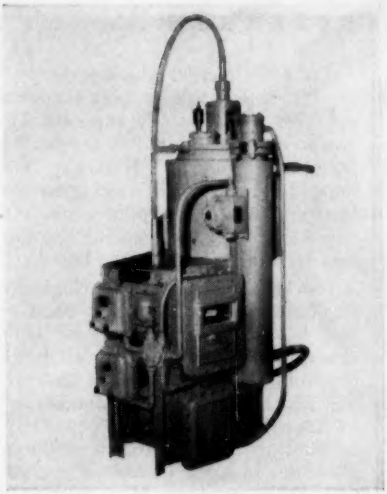

FIGURE II
One type of pilot plant dispersion unit.

Pouring cool sample of sodium dispersed in high flash point medium illustrates ease of handling. Samples are available for initial investigations.

HOW TO MAKE SODIUM DISPERSIONS

With the development of sodium dispersions, the value of metallic sodium as a reaction tool on a commercial scale has been multiplied many times over. While sodium bricks and molten sodium have been used for years in the manufacture of materials such as sodium methylate and fatty alcohols, the high reactivity and ease of control inherent in dispersions permits a vast broadening of practical sodium applications.

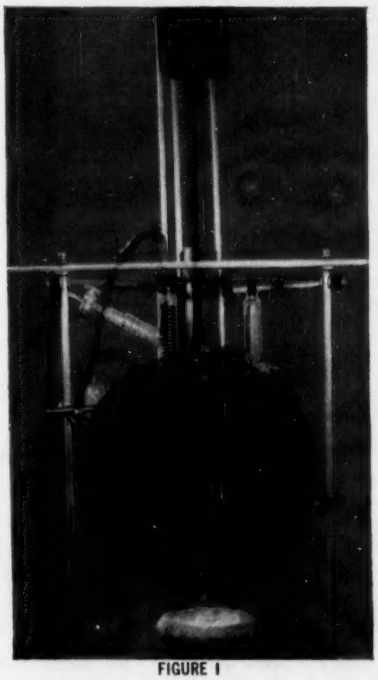

FIGURE I
One type of laboratory dispersion unit.

To test the laboratory or pilot plant value of sodium dispersions in your process is a simple matter requiring little or no investment in equipment. For example, Figure I shows a simple laboratory unit consisting of a creased flask, a special high-speed stirrer, nitrogen purge lines, reflux condenser and addition funnel. Fifteen minutes mixing at 105° C. is generally sufficient to produce good dispersions containing 50% sodium with particles averaging 10 to 20 microns. Subsequent reactions may be carried out in the same equipment, giving high yields under easily controlled conditions.

Figure II shows a 15 gallon pilot plant dispersion unit which handles 20 to 50 pounds of sodium. Modified versions for handling smaller quantities are easily fabricated. The method of preparation and mixing time is quite similar to the laboratory equipment, and the charge consists of brick sodium or molten sodium from a melt tank. Units up to 500 gallon capacity have been put into operation.

Our technical service people will be glad to work with you on modifications of equipment already available in your laboratory or pilot plant, and will supply complete information on dispersion preparation and use. In addition, we offer a booklet, "Sodium Dispersions", which tells you how to make and use these dispersions in many reactions, such as:

- → **Claisen Condensations.**
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Metallic sodium is manufactured by National Distillers Chemical Co., at Ashtabula, Ohio, and sold by U. S. Industrial Chemicals Co. (both divisions of National Distillers Products Corp.) 99 Park Avenue, New York 16, N. Y. Branches in all principal cities.

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But even in cases where you expect trouble, it may still be more economical—aver the lab-study exponents—to use an extrapolation safety factor than build a pilot plant. Naturally, this depends, in no small way, upon the kind and size of the pilot plant. In petroleum and petrochemicals this may well be true across the board.

Proving that it's technologically feasible to go from bench to plant in one big jump still does not conclusively close the door on all functions of the pilot plant. In general, the pilot plant serves a number of traditional purposes. It permits a demonstration of the process, produces quantities of a compound for evaluation, sheds light on flow, corrosion, construction materials, etc.

No Alternative: It's Stewart's feeling that the first of these can be neatly accomplished on a laboratory scale. But where peculiar or unseen factors arise that must be put to the test of operation in process equipment, there doesn't seem to be any alternative to pilot planting.

And that underscores an important point. The Esso people's nine years' experience (and several commercial successes) with bench-scale process development have not made them "antipilot plant." There's no reluctance to go to the pilot plant when such a course is clearly indicated in research.

On the whole, however, Stewart believes that chemical reactions lend themselves nicely to extrapolation from bench-scale data. In continuous polymerizations, particularly, does he foresee a promising opening for this approach. But nearly any field of the chemical industry will yield several potentially fruitful cases for study.

Proving them out, however, may give rise to its own brand of problems. Of perhaps most significance here is a dearth of laboratory apparatus to implement the relatively stringent demands of process development studies. It's difficult to get good, continuous high-pressure pumps. Also on the hard-to-find list are very small centrifuges and filters. These deficiencies will doubtless be remedied if larger demand shapes up.

That interest in bypassing the pilot plant is on the upswing is beyond doubt (*see illustration p. 68*). But it would be next to impossible to gage the magnitude of the trend. A not inconsequential obstacle to its rapid growth is the lack of people with the right combination of engineering and chemical training to set the pace for a one-lap process race to commercialization.

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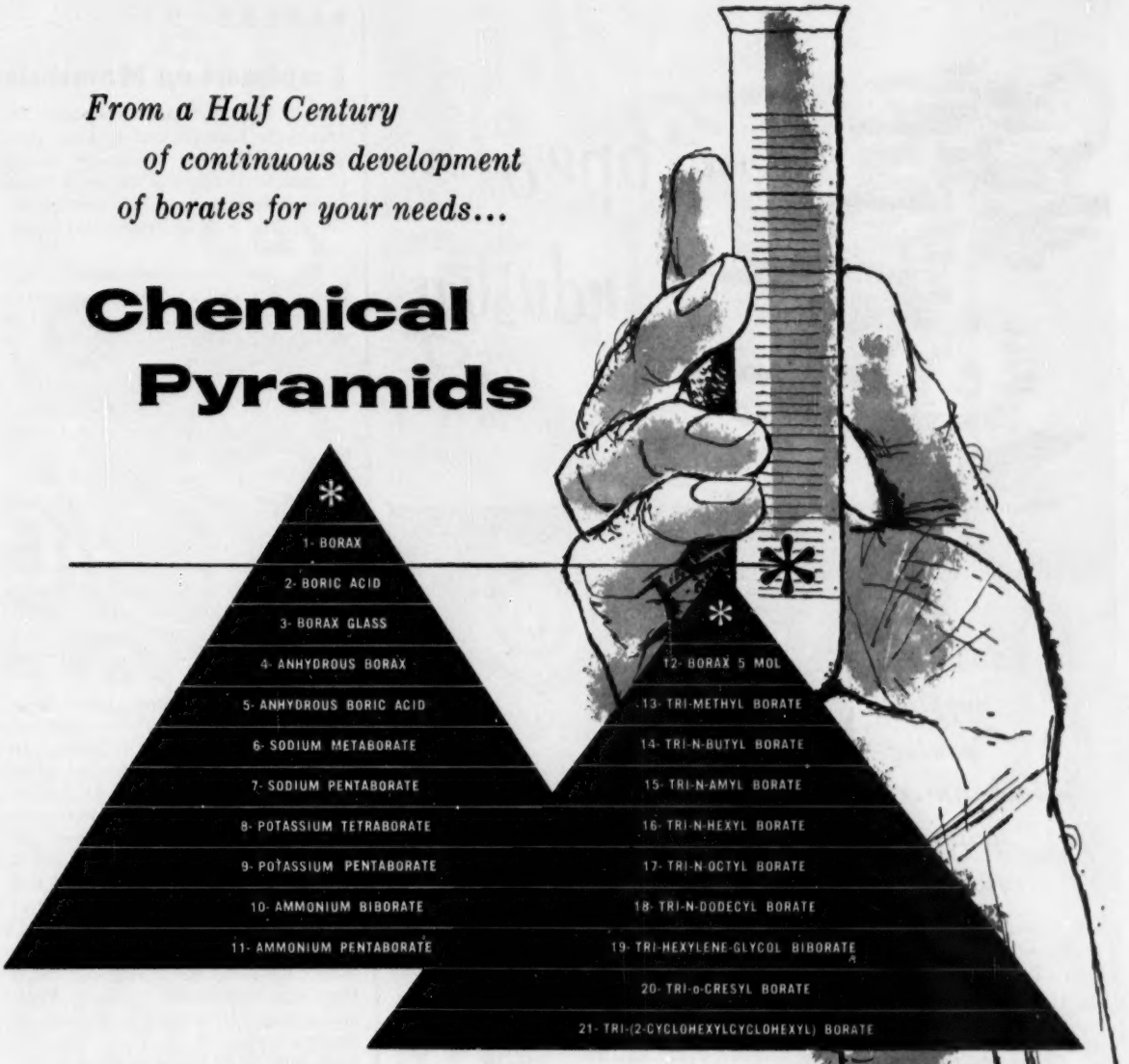

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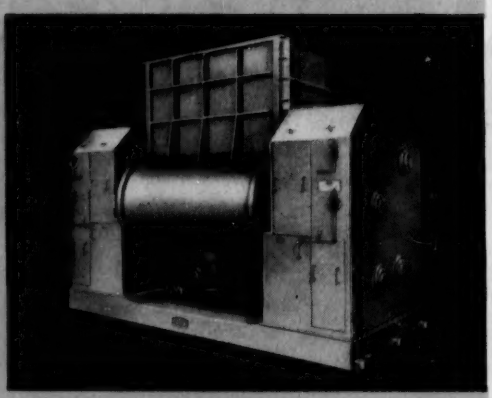

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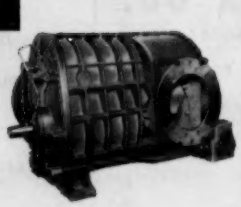

RESEARCH . . . . . .

Emphasis on Materials

Metals and ceramics producers, increasingly hard-pressed to keep pace with requirements for atomic energy construction materials, this week found comfort in a new ceramic coating developed by National Bureau of Standards scientists.

The new coating combines a high barium frit with a refractory of cerium or cerium - chromium oxides. And though it's usable at temperatures up to 1,000 C, it doesn't have a high absorption for neutrons. Normal ceramics can't be used in such applications because they do capture a great number of neutrons.

While the over-all project (of which the NBS experiments are a part) is classified, it is known that one of the limiting factors in design of an atomic aircraft power plant has been that of design materials. Metals that are suitably low in neutron capture often corrode at high temperatures. Low neutron-capturing ceramics may be one answer to this problem.

The bureau scientists tested over 200 coatings made with low neutron-capturing materials. Of these, 16 looked promising on extended heating tests. Coatings a mil thick on five of them gave appreciable protection to #321 stainless, 10 gave good results on #309 steel, and 14 on #310 steel. All worked well on Inconel and similar alloys with low coefficients of expansion.

The thin coatings did not greatly reduce metal-surface oxidation, though they did significantly reduce depth and extent of "stringer" corrosion, a random type of corrosion usually from four to 20 times as deep as the surface oxidation.

In thermal shock tests, the best coatings withstood repeated quenching from 2000 F.

One of the best frits evaluated (NBS No. 435) was about half silicon dioxide, one quarter barium oxide, 6% calcium oxide, 5% zinc oxide, 10% beryllium oxide, and 2% phosphorous pentoxide.

Eyeing the Big Picture: Recognizing the need for intensified studies of chemical and metallurgical problems associated with nuclear power, the Atomic Energy Commission has just approved a new Vitro Corp. of America (New York) program of research.

Vitro's engineering division will investigate preparation of fuel, removal of fissionable product poisons, primary separation of material discharged from the reactor, recovery and reworking of unspent fuel, recovery and decontamination of fissionable material pro-

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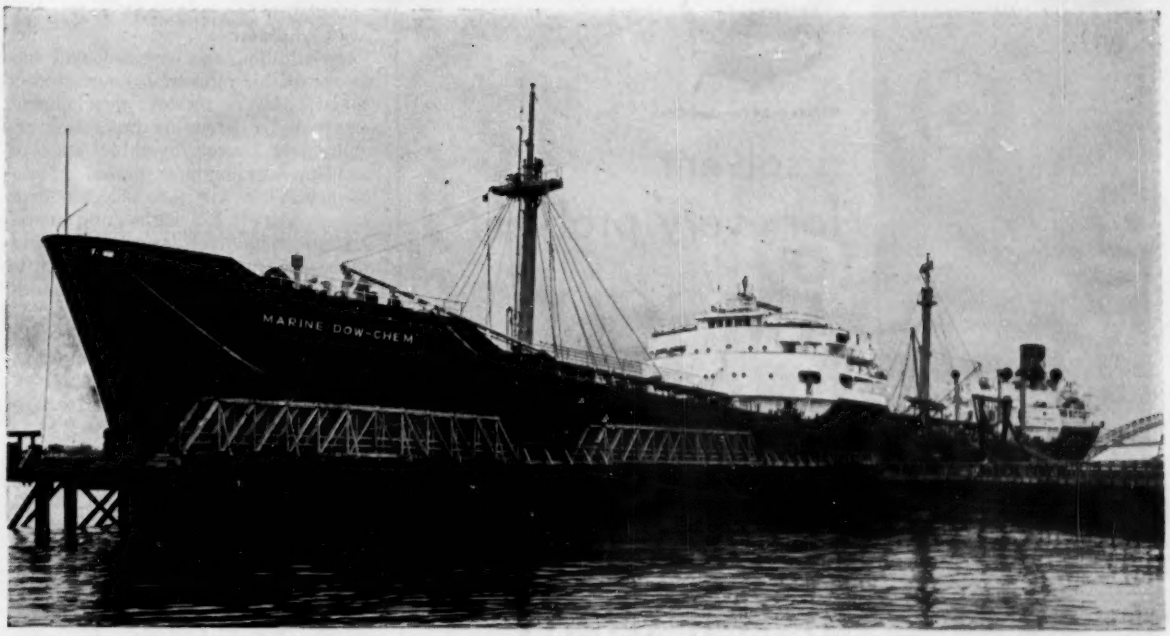

S. S. Marine Dow-Chem on first arrival at expansive Bayonne Terminal.

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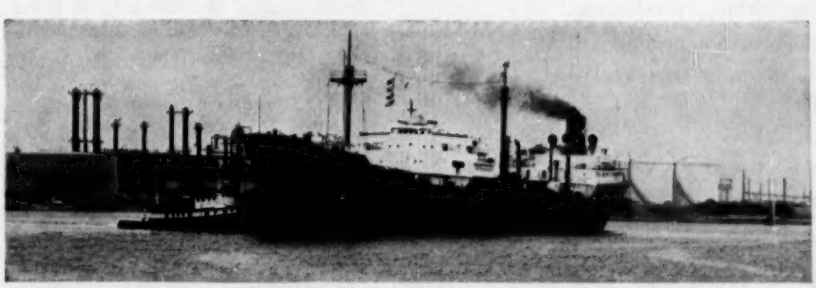
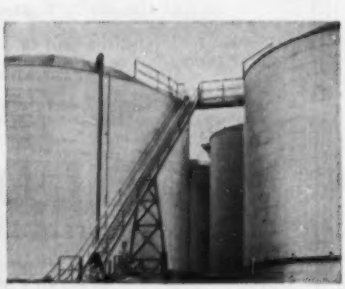
speed volume delivery of 73% caustic soda to users

The Dow Chemical Company now has extensive new caustic soda solution distribution facilities in operation. The *S. S. Marine Dow-Chem*, first tanker ever designed and built exclusively for the sea transportation of liquid chemicals, currently delivers 73% caustic soda in volume quantity to two new Atlantic seaboard bulk terminals, located at North Charleston, S. C. and Bayonne, N. J. Both this thoroughly modern 18,000-ton chemicals carrier and all terminal facilities for cargo unloading, storage and transshipment safeguard the uniform high purity of Dow's 73% caustic solution.

One hundred thousand pounds of commercially pure nickel were used in construction of the *Marine Dow-Chem's* caustic cargo tanks, pumpline and heating coils. Terminal storage tanks are fully nickel-clad, all loading and unloading pumps and lines are pure nickel. Nickel steam heaters keep 73% solution at the exact temperature desired.

This important distribution expansion means that Dow customers are assured even faster delivery—*another* good reason for placing that caustic order with Dow. THE DOW CHEMICAL COMPANY, Midland, Michigan.

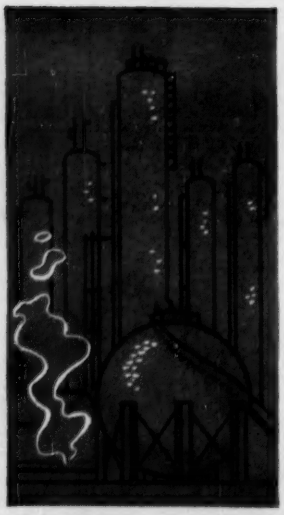




New flagship of extensive Dow waterways fleet begins maiden voyage from Freeport . . . new nickel-lined tanks at Bayonne protect 73% caustic purity during storage.

you can depend on DOW CHEMICALS

DOW



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duced in reactors, and radioactive waste disposal.

In addition, the company will survey available industrial power studies and A.E.C.'s reactor development program to determine processing requirements, most favorable lines of development and most promising techniques. Vitro will then select one or more concepts for engineering analysis and preliminary design studies and make an estimate of processing costs as related to the over-all economics of nuclear power.

During the contractual period (1 year), Vitro will report its findings to A.E.C., will receive, in turn, whatever information and consultation service it requires.

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Tailored Glassware: A new catalog from Corning Glass Works (Corning, N.Y.) lists more than 2,600 pieces of special laboratory apparatus, many never listed before. The compendium—Corning's catalog CA-1, "Custom-Made Glassware by Corning"—is based on items for which repeat orders were greatest during the past 30 years. Items not indexed in the new publication or in Corning's Catalog LP-34 (standard glassware) will still be made to special order.

•

Bio Lab: Completion within a year is expected for Dow Chemical Co.'s just-started biochemical research building at Midland, Mich. It will provide 40,000 sq. ft. of floor space for researching toxicology, industrial hygiene, microbiology, basic biochemistry, and wood products. Director D. D. Irish founded Dow's biochemical research department in 1933.

•

Nuclear Abstracts: A summary of nuclear data that appeared in the literature published during 1952 is now available (25¢) from the Government Printing Office (Washington 25, D.C.). It was compiled by the National Bureau of Standards, is titled "Nuclear Science Abstracts, New Nuclear Data, 1952 Cumulation".

•

Idea Search: Commerce Dept.'s National Inventors Council has just completed its inventory of technical problems affecting national defense. Included in the listing of Armed Forces' needs are the following:

- A semiconductor material suitable for use in transistors, the color of which is dependent on its conductivity type.
- Casting resins (for protecting electronic components) that set up and cure quickly over a wide temperature range (−55 C to 200 C).

How "Dutch Boy" Chemicals help give

the electrical industry

more reliable vinyl plastic insulations

Unprotected vinyl compounds lose desired properties fast when heats go into the 300-400° F. range. Yet in producing vinyl insulations, process heats go this high.

High temperature appliance grades, in addition, must stand prolonged use at 194° to 221° F.

Recently, National Lead research came up with four exceptional heat stabilizers that substantially increase reliability of vinyl electrical compounds.

"Dutch Boy" Tribase and Tribase E maintain the valuable physical and electrical properties of standard grades, without "gassing" or other break down. Ordinarily Tribase imparts the higher reliability.

"Dutch Boy" Dythal is the best available commercial stabilizer to use in high temperature appliance wire insulations. It's good for bright colors, too.

Small amounts of "Dutch Boy" DS-207 help Tribase, Tribase E, and Dythal do an even better job.

Like the Stabilizers, National Lead's most recent developments, "Dutch Boy" Plasticizers also increase vinyl insulation reliability.

Versatile "Dutch Boy" Stabilizers and Plasticizers have proven equally useful in the drug industry, the paint, the cosmetic, the ink, and many another industry.

If you want to explore their uses . . . or if you would like to know more about unique new "Dutch Boy" Gelling Agents . . . or such "Dutch Boy" Special Chemicals as Lead Hyposulphite . . . simply fill in and mail the coupon.

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Please send me the latest information concerning the uses of your new chemicals in the following fields:

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CRIPPLED TOBACCO: In defense, a million-dollar chemical market.

Cure for Tobacco Blights

Recent appearances to the contrary, tobacco men have more to worry about than vociferous medical attacks on cigarettes. They still face a host of problems on other fronts. Among the most serious are attacks by blights (i.e., viruses, fungi, bacteria, nematodes) that annually account for millions of dollars in crop damage and control measures. In this latter respect, chemicals are of some help.

But the tobacco trade is in general agreement that inexpensive, broad-spectrum chemical blight-fighters would find no paucity of takers.

The enemy in this agricultural combat is clearly marked. In its ranks are Black Shank (a fungus); Wildfire and Granville Wilt (bacterial infections); Root-Rot and Root-Knot (nematodes or microscopic worms); and the tobacco mosaic virus.

Double Effort: Brunt of research aimed at effective countermeasures is borne by federal and state agricultural experiment stations. The best approach thus far has been to try to hold the disease in check by agricultural practices (e.g., crop rotation) while resolutely striving to develop new disease-resistant varieties of tobacco.

Present agricultural control methods are costly, tedious and clumsy.

To thwart Black Shank, for example, the grower is instructed to switch the stricken field to another crop (easier said than done in the face of growers' resistance to change), keep it out of tobacco for at least a year and preferably longer.

Three-year rotation also is usually sufficient to inhibit other blights, and in the case of some disorders—e.g., Granville Wilt—farmers can turn to such resistant strains as Oxford 26, developed by government researchers. But the botanists have not been nearly as successful in their attempts to come up with strains impervious to all other plagues.

Triple Saving: And that's why the tobacco country is ripe for chemical aid. Effective chemical control would save time, money and considerable effort on the part of manufacturers who are constantly adjusting blends to account for new tobacco varieties. This necessitates continuing intensive product control (laboratory and organoleptic) where the manufacturer wants to preserve unchanged the taste and other characteristics of his product. American Tobacco Co., for one, has reduced this effort to a fine art, is constantly seeking new scientific control procedures.

The reward for a good broad-spectrum chemical agent for prevention and/or therapy would be considerable. Last year 2.25 billion lbs. of tobacco were grown on 1.77 million acres in the U.S.

Chemical makers are not completely ignoring this potential. Dow, for one, is researching this field, currently offers Dowfume MC-2 (methyl bromide, 2% chloropicrin) and W-85 (an 85% ethylene dibromide formulation) for ridding soil of nematodes prior to planting.

MC-2 is used in seed beds, costs about 85¢/lb. (enough for 1,000 sq. ft.); W-85 is applied to soil for transplanting purposes, is pegged at $5.25/gal. (used at the rate of 4.5 gal./acre).

Chas. Pfizer & Co. (Brooklyn) reports promising results with streptomycin on blue mould fungus (*Peronospora tabacinal*), is sizing up other antibiotics in the light of this discovery. Du Pont and Rohm & Haas also have products to fight blue mould.

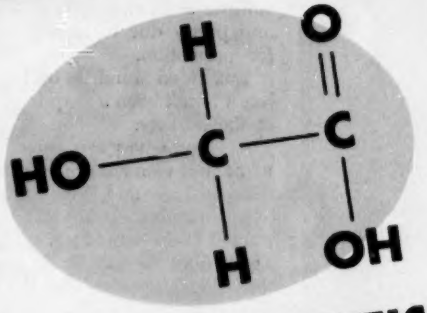
Dithane Z-78 (Rohm & Haas) is zinc ethylene bis-dithiocarbamate, costs about 85¢/lb. in concentrated form for use in spray solutions (¾ lb. to 25 gal. water). It's also available as a dusting material (10% Dithane) for about 10¢/lb. For small tobacco plants, 1½ to 2 lbs. of this dust is needed per 100 sq. yds. of seed bed, larger plants require 3½ to 4 lbs. for the same area. Based on the same chemical is Du Pont's Parzate. Another Du Pont tobacco fungicide is Fermate, ferric dimethyl dithiocarbamate (about 70¢/lb.), also used in either spray or dust form.

Effective within limits on individual disorders, none of the abovementioned is the entire answer.

For one thing, most are not applicable to plants in the field, must be used during the seed-bed stage. The Du Pont products appear to be exceptions, have seen service in blighted Florida and Connecticut tobacco fields.

To further complicate matters, experts at the tobacco experiment stations at Windsor, Conn., and Beltsville, Md., point out that tobacco farmers just won't use three or four separate crop treatments. The need is for effective products to counter the broad spectrum of tobacco ailments.

AN IDEA-CHEMICAL FROM DU PONT



HYDROXYACETIC ACID

(Glycolic Acid)

REACTS WITH:

- Alcohols to form esters
- Acids or anhydrides to form acyloxy derivatives such as acetoxyacetic acid
- Ammonia or amines to form salts or amides
- Itself to form inner esters or glycolides

pH of Aqueous Solutions:

Concentration Wt. %	pH at 25° C
0.5	2.5
1.0	2.33
2.0	2.16
5.0	1.91
10.0	1.73

Here is an economical organic acid you should investigate

Du Pont hydroxyacetic acid is a proven organic acid for many industrial applications. Available as a 70% technical solution, hydroxyacetic acid is weaker than the common mineral acids, yet is more economical than most other organic acids. Thus it offers low cost plus safety in critical operations such as pH control and textile dyeing.

Hydroxyacetic acid solutions are miscible in all proportions with water and water-soluble organic solvents such as methanol, ethanol, acetic acid and acetone to insure maximum flexibility in processing operations.

The low volatility and lack of odor of hydroxyacetic acid help provide better working conditions wherever it is used. Among other industrial uses, hydroxyacetic acid has become a valuable aid in the processing of textiles, leather and metals and a useful intermediate in certain chemical reactions.

Why not investigate the use of hydroxyacetic acid in your business? We'll be glad to send more information on this low-cost organic acid—specifications, properties, suggested uses. Just send in the coupon below, or write on your letterhead today.

AVAILABILITY: Du Pont hydroxyacetic acid is shipped from conveniently located stock points in 6,000-gallon tank cars (60,000 lbs., 70% solution) and 10,000-gallon tank cars (100,000 lbs., 70% solution). It is also available in 50-gallon wooden barrels (average net weight 490-500 lbs.).

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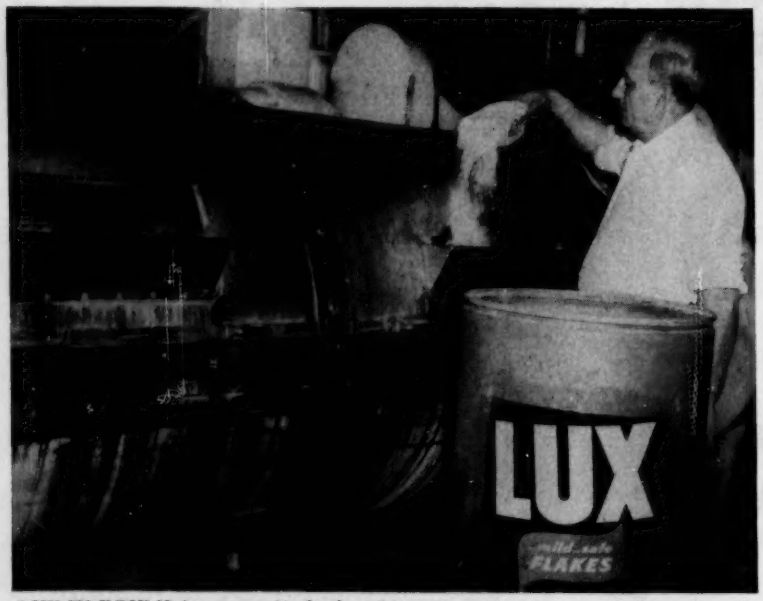

LUX IN DRUMS is a necessity for laundries—they take about 8,400 lbs./year each.

A Reputation Pays Off

Booming Lux for laundries, Lever Bros.' industrial sales division has come up with one of the freshest ideas in years for boosting soap sales.

Promotion is built around the familiar Lux name and its carefully nurtured "gentleness" reputation—and it has nabbed nearly 540 laundries for Lever already.

"Gentle" Lux Flakes have taken on a tough new job. Under the careful guidance of Lever's industrial sales division, Lux is now being pushed for commercial laundries – they benefit from their "gentleness" reputation, and Lux sales have made a "substantial" jump.

Already, industrial salesmen have signed up some 540 commercial laundries coast-to-coast.* That's roughly 9% of the nation's laundries, and a pretty fair record for an eight month's program.

Plugged nationally via Lux radio and TV shows, the program is further aided by a comprehensive setup of advertising mats, promotional literature, sample Lux bars, and the like. And though Lever cagily keeps production figures to itself, it's well known that an average U.S. laundry uses about 8,400 lbs. of soap and detergent per year—that already adds up to a 4.5-million-lb. outlet for Lux—or some other Lever washing product.

Vigorous Approach: Lever doesn't claim an original in its new plan—Ivory Laundries were well known in the mid-'20s, and Lever itself had a few Lux laundries at that time, too. But the wide promotion and vigorous selling accompanying the current program is attracting a lot of attention.

The new plan, worked out by the still-young industrial division (formed only in Jan. '53), was quietly inaugurated in Nov. '53 at the Penn Sanitary Laundry and Dry Cleaning Co., Cleveland. It went over so well that by January of this year Lever began full-scale selling of its idea.

Gentle Approach: If the Lever attitude toward selling laundries is energetic, the prime point in its plan for laundries is gentleness. Pushed since its introduction as a gentle, light-duty product, and never advertised for heavy washing jobs, Lux has exactly the sort of reputation that laundries can use. (Lux laundries, however, are not aiming to get more of the lingerie and light woolens business.)

In recent years the commercial laundry business has sagged badly, partly because of its completely unfounded reputation of washing with sulfuric acid, rinsing with aqua regia, and partly due to lack of new bases for promotion.

Lux aided laundries on both counts, but it hasn't been a snap to sell. Some of the hurdles:

- Housewives recognized the Lux name, but wondered if washing everything in Lux–and "everything" is just what member laundries have contracted to do—would get clothes clean. Lever (and the laundries) emphasized that their superior equipment—water softeners, multiple sudsings, extra rinses, etc.–enable them to do a job the housewife couldn't.

There are some laundry men, however, that still express doubt that a low-titer (light-duty wash products have a titer under 35, generally, and the ordinary commercial laundry soap has a titer of 40 or so) soap can really wash white goods. Their contention: in water 160 F, the soap with a considerable coconut oil content and low titer (like Lux) will break down, wash ineffectively. They agree, though, that as a way to lift the drooping laundry business, it's a good idea.

To help assure quality of the washing, Lever is setting up a plan with the American Institute of Laundering to check special soiled cloth swatches at intervals, for degree of whiteness and loss of tensile strength.

- Housewives (and sometimes laundry routemen) don't quite believe that the flakes the laundry uses and the ones in the "familiar blue box" are the same thing. Lever welcomes the chance to show customers that flakes shipped in drums and bags are precisely the same.
- All seemed to feel that using Lux will raise costs and laundry price, but Lever thinks it has pretty well scouted that talk. In spite of its higher selling price,* Lever says it can satisfy most laundry owners that they can readily match or beat the costs of using familiar yellow soap chips.

Heavy on Promotion: One of the big items behind the success of its plan, Lever says, is its completeness.

On both the Lux radio and Lux TV programs, the laundries are given a weekly mention (for the summer, the plugging has been dropped). Lever sells sample soap bars to laundries to be included in laundry bundles, or to

* At last count, the Dakotas were holdouts, but Lever has no doubt they'll be represented before long.

* Price has fluctuated considerably, but it is now 13¾¢/lb. in truck loads; this compares with 9¾¢/lb. for yellow soap chips.

a work horse re-shod . . .

SWIFT TAKES THE RED OUT OF RED OIL

● Long a work horse in the Chemical and Process Industry, RED OIL . . . like the old gray mare, ain't what it used to be.

As in many basic materials, the demand for increasingly higher quality in the whole family of Oleic Acids is dictated by a growing need for more uniform, efficient and dependable finished products. More and more evident on spec sheets are increasingly narrow limits for fluctuations as to color and color stability . . . many producers, who formerly paid little attention to color, now demand specific color densities.

To meet these tightened conditions with a broadened line of specific products, Swift and Company is now using a special low temperature solvent treatment that permits the selective extraction of color bodies and other impurities from Swift's Red Oils. As a result . . . Swift's Red Oils are not only available in a wide range of specifications—but they can be depended upon to *hold* their specifications.

If you are producing a product or have an application where uniform quality or "application" purity demand renewed attention to your use of Red Oil or Oleic Acid, call Swift *first* and remember . . .

ONE TRIAL IS BETTER THAN A THOUSAND CLAIMS

A new bulletin describing Swift's Red Oils and Oleic Acids, giving pertinent specifications and shipping information is available on request. Just check the proper box when you return the coupon for further information on any of the Swift's products listed below:

Oleic Acid (Red Oil) · Animal Fatty Acids · Vegetable Fatty Acids · Stearic Acids · Hydrogenated Fatty Acids · Larex (Swift's Lard Oils) · Neatex (Swift's Neat's-foot Oils) · Spermex (Swift's Sperm Oils) · Spermaceti U.S.P. · Monoglycerides · Sulfonated Oils · Textile Processing Oils · Anti-Foam Agents · Glycerine · Tallows · Palmex (for Steel Mills) · Hydrogenated Glycerides

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how much are YOU losing *"up the stack"?*

The Barnebey-Cheney system in a well-known artificial leather plant can recover $500,000 worth of mixed solvents annually. Formerly, this amount was lost up the vent stack. In addition, the recovery system satisfied a Board of Health complaint that foul solvent-laden air was being exhausted into the plant neighborhood. This system can recover a million gallons of valuable solvent yearly. If your business is losing money "up the stack," call, write or wire Barnebey-Cheney. There's no obligation, of course.

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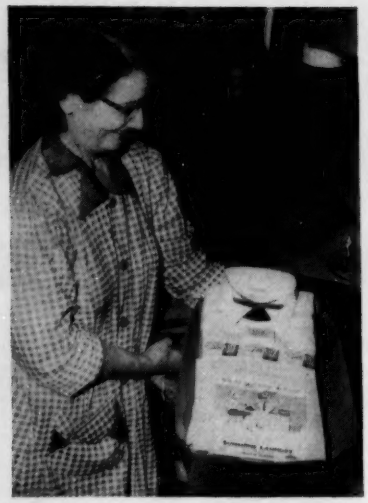

PROMOTIONAL INSERTS, sample Lux bars and cartoons, go in laundry bundles.

be given out by routemen making sales calls. Tie strings for handkerchiefs, tape for shirts, and similar paper wrappers with the Lux imprint can be obtained at cost from Lever.

Lux is now put out in drums, well marked with the Lux name, and bags of the flakes, printed so that the bag can be made into a banner. Laundries are pitching in enthusiastically, too. They stack the drums where customers can see them, and many have increased their own advertising programs with emphasis on Lux. Some have even repainted their trucks in the red and blue Lux box colors.

That the whole program has gone over is attested to by the fast-growing number of Lux laundries. They seem to be well pleased with their deal, too, since many report business improvements of 10% or more. And Lever now has an *entre* to contact the remainder of the 6,000 laundries in the U.S. (which use about 50 million lbs. of soaps each year).

But Lever intends to stick pretty closely to the top-quality laundries, stay away from the linen services and the self-service laundries (although they swell the consumption to 150 million lbs./year). It figures that none of these will help the Lux reputation, and it's the reputation earned over half a century that has made the whole program pay off.

TRUCKS carry out the Lux theme; drivers wear badges and special shoulder patches.

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As acknowledged pioneers and recognized authorities in the correct use of pyrethrum, allethrin and their most effective synergists, MGK 264 and piperonyl butoxide, we offer standardized concentrates, extracts, dusts of guaranteed uniformity.

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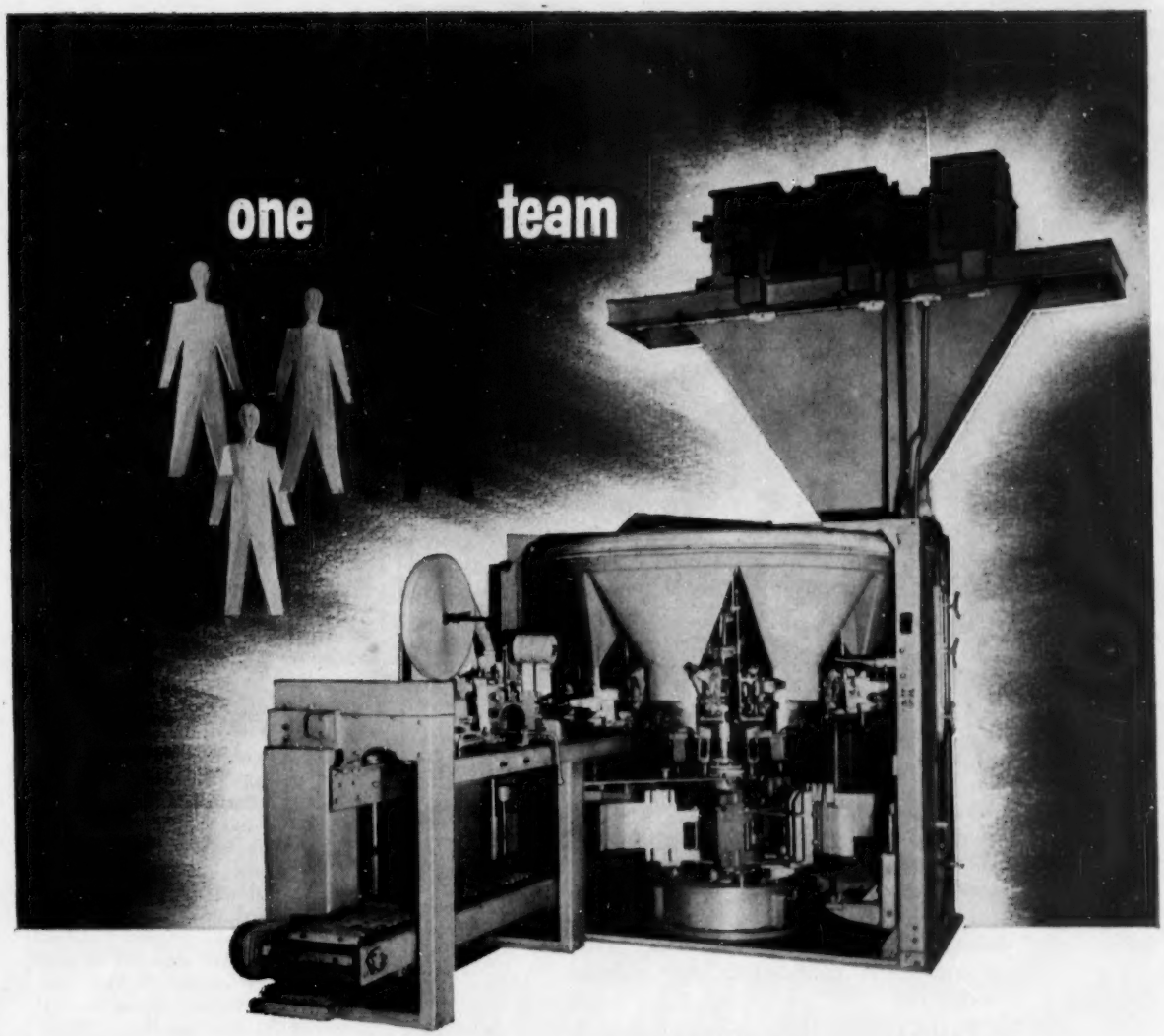

The Model A Bagpaker® makes large tonnage bagging of free flowing materials a one man operation—and up to 350 tons can be bagged per 8 hour shift without overtime.

All the operator does is hang the empty bags on the filling spouts. Accurate weighing, filling, settling and sewing are fully automatic.

Engineered and manufactured by Bagpak Multiwall Bag experts, the Model A Bagpaker® is designed for reliability and durability. It can be depended upon to give years of service—and to pay for itself in as little as one year. If you are interested in the utmost in economy and efficiency in packaging bulk materials, you'll want to have all the details on this on this efficient machine. For complete information on how the Model A can fit into your packaging picture write to: K-17.

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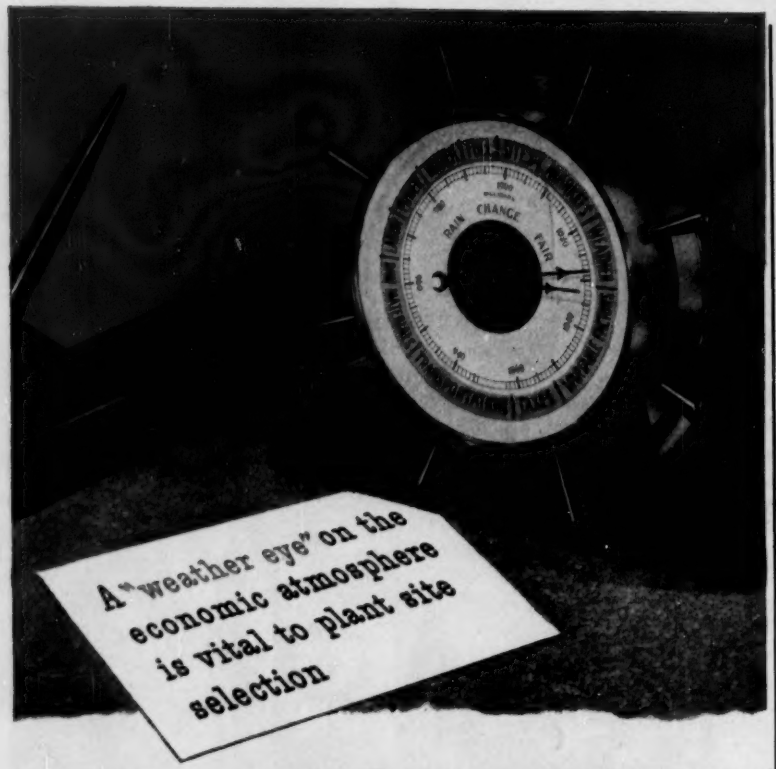

Let *us* show you a site where the atmosphere's *right!*

You select a plant site with two objectives in mind—profitable production and continuing growth. *You* know it pays to steer the course which offers the smoothest sailing. B&O's Industrial Development men will help you chart such a course—in confidence, and without obligation.

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Join the "fleet" of industrial enterprises we have successfully piloted to good sites. *Ask our man!*

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Baltimore & Ohio Railroad

Constantly *doing things*—better!

YOUTHFUL GARDENER: Water-soluble packet is a safe pesticides container.

Pack with Potential

Not only a new product but one in a unique package is Renflo Chemical Co.'s (Island Park, N.Y.) new garden spray, In-Sac-Iside. Actually, it's the package angle that's most likely to cause a stir among chemical specialties manufacturers.

It's not hard to understand why: the item comes in a polyvinyl alcohol film sack that will dissolve in cold water in three seconds. This fact, according to Renflo, makes for (1) safety and (2) easy handling. (Compositionwise, In-Sac-Iside is Ferbam, lindane, Aramite, and DDT.)

Renflo did not develop this package itself, but collaborated with the plastics division of Reynolds Metals* and Dumont Enterprises (Englewood, N.J.), a custom-packaging firm. Dumont reports that the idea of a polyvinyl alcohol film that would dissolve readily in cold water had been toyed with for the last three or four years.

However, it's only been in the past year that Reynolds began making a type of film that would do the job. It is heat-sealed, simple to print upon.

The future, as Dumont sees it: widespread use of the new-type package for chemical products (particularly toxic ones), detergents, and frozen foods.

In-Sac-Iside comes in a container of five one-ounce packages, which sells for $2. Each sack, which is simply

* Last week the division featured the spray sack at the three-day Western Packing and Materials Handling Exposition in San Francisco.

dropped in the water, produces one gallon of solution. The insecticide-fungicide is said to destroy Japanese beetles, thrips, red spider, lace bugs, codling moths, black spot of roses as well as other garden pests and fungi.

•

Box Pack: Sage Laboratories, Inc. (New York) has changed the form and package of its heavy-duty dry bleach (based on Halane, the Wyandotte product). It's now spray-dried, packed in cardboard containers instead of bottles, in which it was introduced *(CW, Nov. 21, '53)*. Sage says it has licked the caking problems for its bleach—Colgate, on test marketing its Pruf Dry Bleach (similarly based on Halane), initially ran into some difficulty with the product's caking in boxes on store shelves.

Sage is also trying its hand at low-sudsing synthetic detergents for automatic washers. The Sage product is spray-dried and is tinted blue (like Lever's Vim, a low-sudsing product).

•

Defoamer: Monsanto's organic chemical division has brought out an acid-stable defoaming agent said to be particularly effective in organic systems. Soluble in most organic solvents, Defoamer PC-1244 is applicable in concentrations varying from 5 to 5,000 ppm. of active ingredient. It is supplied as a 40% solution in kerosene.

•

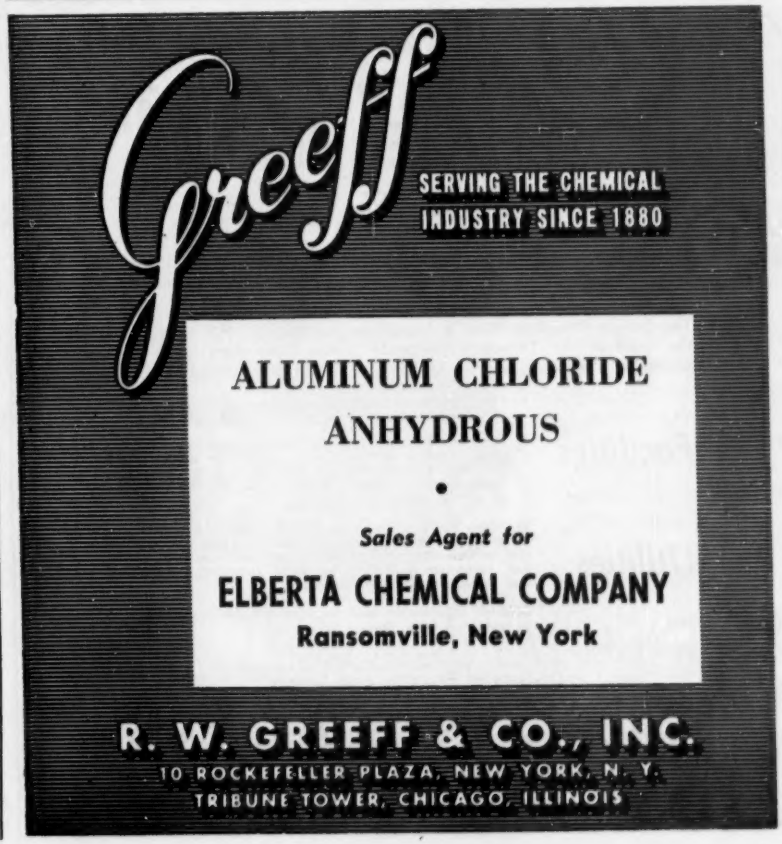
Economizer: Presstite Engineering Co. (St. Louis) now offers a sealing tape said to make possible more efficient and economical molding of polyester-glass fiber laminates. The product, No. 579.6 Polyvinyl Film Sealer, is designed as a replacement for metal forms, gaskets, rings and C-clamp in hermetically sealing the PVAC blanket or bag in vacuum bag molding of the laminates. According to the maker, the sealer is light green, odorless, permanently soft, nonstaining, nonbleeding and nontoxic.

•

80% Savings: Hunter Photo Copyist, Inc. (Syracuse, N.Y.) has a new machine for office reproduction work that operates on the principle employed by the self-developing camera. The Hecco-kwik produces immediate, dry copies of any typed, printed, written or drawn material, the firm claims. The process is said to permit savings of 80% over commercial photostating and photocopying costs.

•

Insulating Compound: Insl-X Sales Co. (Ardmore, Pa.) markets a high-dielectric-strength dipping compound



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Division of Property and Supply

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505 Lupton Building, Chattanooga, Tennessee

SPECIALTIES. . . . .

for insulating and protecting tools and equipment. It's said to eliminate the need for taping tool handles or purchasing tools already equipped with nonconductor handles. Name: E-33. It's available in red or black.

•

Rug Saver: Artloom Carpet Corp. (Philadelphia) is now promoting a chemical spray treatment called "Dellay," to reduce rug and carpet soiling. Sold in quart containers ($2.49) with a spray-top attachment, a quart is sufficient for a single 9x12 ft. rug of any fiber.

•

Right Through: A. Ludwig & Co. (Chicago) has a new product called Dr. Quix, a wetting agent that penetrates wallpaper, liquefies paste and allows hot water to follow so paper can be removed. Concentrate to make 2 gal. costs $1.

•

Paint for Dark: O. E. Linck Co. (Clif-

Cutouts for

VINYL FILM plus a special pressure-sensitive adhesive add up to a new product, Con-Tact, for the home decorator. It's available in a variety of stripes, woodgrain designs, and marble effects (at 59¢ yd., 18 in. wide). The user simply trims the sheet to shape, peels off

ton, N.J.) is promoting Glitter-Glow Kit with glitter crystals and a phosphorescent - fluorescent paint that glows in the dark. Though made primarily for children's use, it can be used on light switches, lamp bases, fishing plugs.

•

Summer Product: National Drug Co. (Philadelphia) is making a new drug dubbed Resion-PMS, an ion exchange resin, antibiotic and sulfa mixture, recommended for "summer diarrhea." Sale is by prescription.

•

No Welcome: Insects get no welcome from a repellent formulation just patented by Toivo Kauppi, at Dow Corning (U.S. Pat. 2,681,878). The formulation is made with a silicone (2% or more), soluble in organic solvents.

•

Name Change: By-Chemical Products Co. (San Francisco), chemical specialties maker, has changed its

the Decorator

the protective backing, and presses the waterproof sheet into place. The adhesive makes it possible to adjust the sheet until a perfect fit is obtained. Monsanto Ultron film is used by Cohn-Hall-Marx for Con-Tact; the adhesive is C-H-M's own development.

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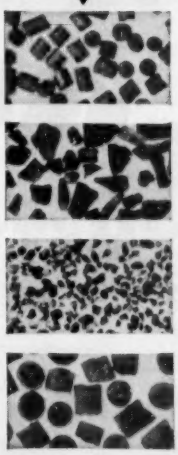

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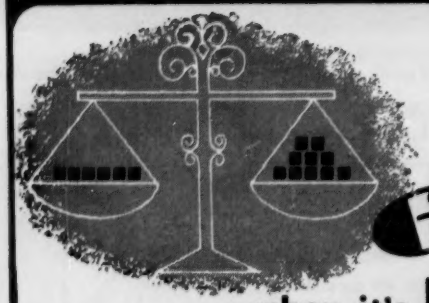

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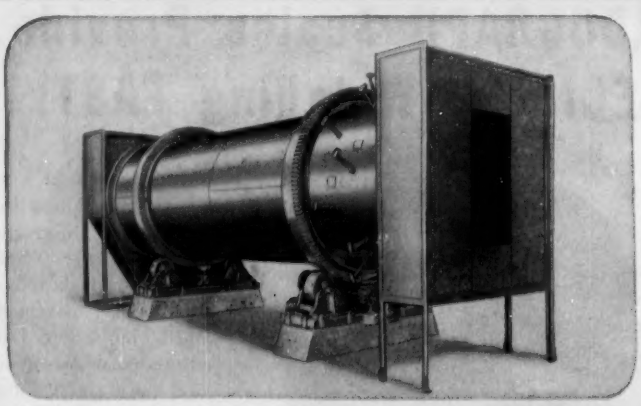

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For quick reference see your 1953 or '54 Chemical Engineering Catalog.

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SPECIALTIES. . . . .

name to E. A. Thompson Co., Inc. The prefix, Thompson's, now used with its waterproofing compound, will be applied to the entire line of products.

•

Three-Speed Gun: Nutritional Concentrates Inc. (New Lexington, O.) is putting out a spray gun with three-speed mixture control that can be used to apply detergent or soap to autos, window screens, storm sashes, or to apply soluble fertilizers, soil conditioners, herbicides, insecticides.

•

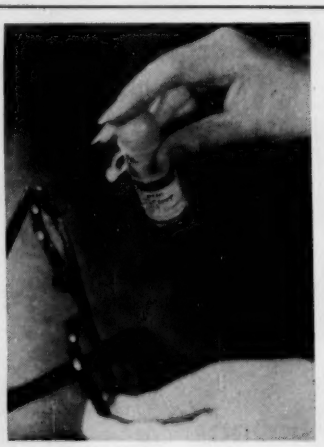
Safety Jamboree: The Industrial Housekeeping Safety Guild, Inc., will hold its first major jamboree in Atlantic City, Nov. 6-11. A forum will highlight the need for setting up a tradewide seal of approval.

•

Skipping Throwsters: Hans C. Bick Inc. (Reading, Pa.) has developed a chemical compound that, when applied by hosiery manufacturers to size and lubricate nylon yarn, is said to save time and cost in sending the yarn to throwsters. Tradename: Bickatol.

•

Nonetching: Enthone, Inc. (New Haven, Conn.) has a new detergent for cleaning aluminum, Aluminum Cleaner NE-6. It is said to remove marking inks and crayon, without etching the metal.



Orb Aid

PURSE-SIZE atomizer, made of rubber and plastics, is used by Chemical Electronic Engineering. (Matawan, N.J.) for its glasses cleaner, Optic Kleer. Evans-Crowder Co. (Detroit) designed the atomizing unit, which is made with American Cyanamid's Beetle plastic and polyethylene.

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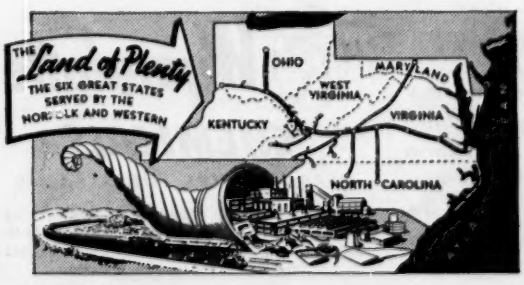

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"Wyandotte came through for us in a manner which was highly pleasing"

—Frank E. Wotalewicz, Kalamazoo Vegetable Parchment Co.

"We make a broad line of papers ranging from food-protection papers of the highest purity to offset and bond papers for printing," says Frank E. Wotalewicz, purchasing agent, Kalamazoo Vegetable Parchment Company.

"We have been using Wyandotte Chlorine for more than 18 years in our bleaching process and for water treatment. Our water consumption is approximately 30 million gallons per day, and, of this amount, it is necessary to chlorinate 8 to 10 million gallons. The importance of chlorine to us is evident.

"When chlorine was tight, Wyandotte came through for us in a manner which was highly pleasing . . . we appreciate such exceptional service from our suppliers."

Kalamazoo Vegetable Parchment Co. also uses Wyandotte Soda Ash and PURECAL* in their papermaking. In the paper industry, as in textiles, rubber, metalworking — every industry that uses chemical raw materials — Wyandotte maintains multi-product lines and backs them up with exceptional technical service in the laboratories and in the field. If you require chemical raw materials, or have a chemical or materials handling problem, send us data on the nature of your problem . . . or write for a Wyandotte representative to call. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in principal cities.*

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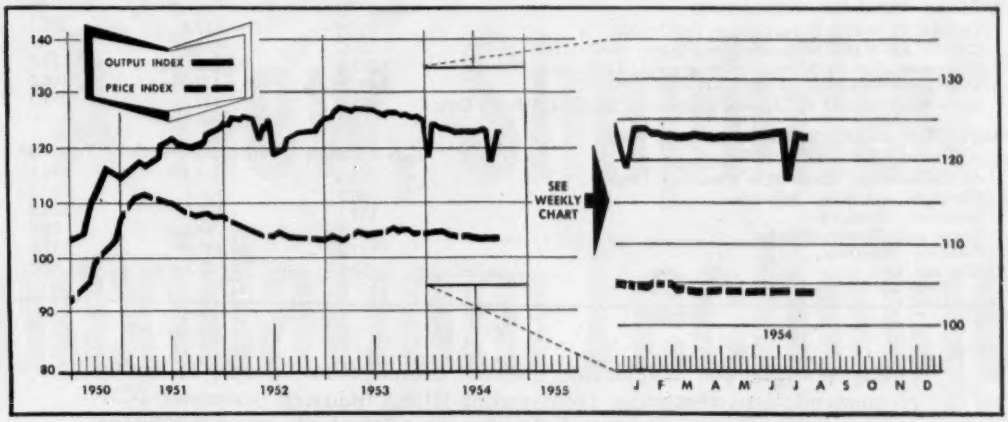

CW Index of Chemical Output—Basis: Total Man Hours Worked in Selected Chemical Industries
CW Price Index—Basis: Weekly Prices of Sixteen Selected Chemicals

MARKET LETTER

The Labor Day weekend, this year as in the past, will be a psychological pivot-point for chemical market activity, marking the end of traditional dips attributable to vacation and plant-repair shutdowns. At the moment there's a noticeable leaning toward optimism that fall business will be satisfyingly brisk.

•

That holds true for formaldehyde, among other items. Most marketers (except those on the West Coast) report a fairly sustained demand from major outlets. And although the early summer price cuts—which were inspired by the methanol drops (CW Market Letter, June 12)— have acted as a sales stimulant in a minor fashion, the further expected perking is more closely allied with seasonal factors.

The prolonged strike on the West Coast involving the plywood industry (prime resin and adhesives customer) has depressed the formaldehyde sales curve. Coast producers, however, see a brightening break in the situation: the strike is being settled around the fringes as a few independent plywood mills patch up their differences.

Right now a few observers view the piled-up West Coast formaldehyde stocks with a degree of dejection, but on the whole, sellers expect a quick whittling when the plywood industry gets back to work.

•

Spreading strikes in the copper area have sparked a hectic hustling among consumers who fear an imminent strapping of available supply. The scrambling was touched off when Kennecott Copper's four Western divisions—which last year turned out nearly 50% of the total domestic production of 957,000 tons—were strike-struck early last week.

No market balm either is the news that the company's El Teniente copper mine in Chile was also down, and that Anaconda Copper Mining workers in the U.S. would walk out this week.

As might be expected, copper prices seem a cinch for elevation.

•

Meanwhile, the Army Chemical Corps has just about untied a

MARKET LETTER

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
CHEMICAL WEEK Output Index (1947=100)	122.9	122.8	126.1
CHEMICAL WEEK Wholesale Price Index (1947=100)	104.2	104.3	104.7
Bituminous Coal Production (daily average, 1,000 tons)	1,293.0	1,233.0	1,589.0
Steel Ingot Production (1,000 tons)	1,496.0(est.)	1,474.0(act.)	2,106.0
Stock Price Index of 13 Chemical Companies (Standard & Poor's Corp.)	325.9	324.2	251.7

MONTHLY INDICATORS—Wholesale Prices (Index 1947-1949=100)	Latest Month	Preceding Month	Year Ago
All Commodities (Other than Farm and Foods)	114.3	114.2	114.8
Chemicals and Allied Products	106.7	106.8	106.2
Industrial Chemicals	117.1	117.0	120.2
Drugs and Pharmaceuticals	94.0	94.0	93.6
Fertilizer Materials	111.9	111.6	113.8
Oils and Fats	52.0	55.7	46.7

knotty phosphorous oxychloride disposal problem. The Corps, following recommendations stemming from recent BDSA-industry powwows (CW Market Letter, July 3), is negotiating for sale of the bothersome 3,000 tons of "impure" oxychloride.

The amount, which will be delivered within the next two or three months, represents slightly more than total normal U.S. output for a comparable period.

Contracts are to be signed with established commercial oxychloride makers, who will purify the material to meet commercial specifications, distribute the resulting product through regular trade channels. The Army will supply the required transportation for the sales, since industry, at the moment, doesn't have enough suitable tanks available.

The impure grade of oxychloride is a product of the Army's phosphate development works at Muscle Shoals (Ala.). The supernumerary shipments, however, will end when the Chemical Corps puts into operation a now-testing unit that will reduce and recycle the impure material, making it suitable for reuse.

•

The government will exert more influence on lead and zinc. Despite industry and Congressional pressure for tariff boosts on the nonferrous metals, the President over the weekend decided on an alternate route to further domestic industry relief. U. S. stockpiling purchases are to be upped—probably enough so to truncate current top-heavy stocks. The new buying may edge prices higher (CW Market Letter, May 8)—if not immediately, then very soon.

•

The most significant facet of the toluol market is its current steadiness. Industrial demand, while not racing, is brisk enough to just about blot up all available material—a condition likely to be maintained through the fourth quarter.

Government requirement is relatively small when compared with earlier siphoning, and even Washington crystal-ballers today admit they're looking into a cloud as far as judging the tempo of future toluol take is concerned.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending August 23, 1954

UP

	Change	New Price		Change	New Price
Chlorinated rubber, 125 and 1,000 centipoises, ctns., c.l., works	$ 05	$ .65	Nitrogenous process tankage, bulk, works, per unit of ammonia	$ .15	$3.65
Salt cake, dom., bulk, works, 100% Na_2SO_4 basis, per ton	2.00	24.00			

All prices per pound unless quantity is stated.

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for natural fats, oils and derivatives

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- Minimizes acid requirements

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A SUMMARY REPORT on the progress that has been made in the promising new field of epoxidation and hydroxylation is also available in a handy reference booklet. It describes how epoxides are formed; how hydrogen peroxide—manufactured by Du Pont—goes into the preparation of the finished product. The booklet also contains one of the most complete bibliographies available on this interesting subject. Use the coupon below to get your copy.

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"Magic Pitchers" can now be made with the assistance of Monsanto customers who produce styrene-type ion exchange resins. These resins purify water just by contact, taking out practically all dissolved mineral hardness.

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Ion exchange resins are the most practical, inexpensive means of removing small quantities of impurities from liquids.

Investigate this suggested application . . . it is another of the many jobs styrene-type ion exchange resins can do.

Monsanto is a major producer of **STYRENE MONOMER**, the basic resin forming compound, used by customer companies to make styrene ion exchange resins. For application details, write or call **MONSANTO CHEMICAL COMPANY, ROOM 1502, PLASTICS DIVISION, SPRINGFIELD, MASS.**

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SMALLER WASHERS: To chemical sellers they mean bigger markets . . .

No Blue Mondays

Swirling around laundry chemical marketers today—and unsparked by them—is a unique switch in outlets that promises to add a brighter sparkle to sales.

The development: growing popularity of the local family-wash service stores, which bid fair to supplant old-style commercial laundries as the prime laundry chemicals consumer.

Too, there's a trend within the trend—one that may also bring a more frequent tinkling to the chemical seller's cash register. Newer open-end washing machines—which can do a load of family wash of 25-50 lbs. at a time—are beginning to displace the smaller-size (8 to 9 lb.-load) automatic units in the neighborhood tote-it-yourself laundries.

The ultimate level of business, of course, depends principally on the number of families shying away from the old-fashioned household washtubs. But though there have been more customers of commercial laundries during the past few years, their number is not increasing as rapidly as the number of urban families. Note this alternate-year comparison of the potential urban market for the commercial service vs the actual:

	Urban families (millions)	Complete User*	Partial User*
1947	24.5	2.5	6.6
1949	25.5	2.6	7.4
1951	28.1	2.5	7.6
1953	31.1	2.2	8.7

During the past two years, the number of possible customers has increased about 10% (some 3 million), but the industry made an actual gain of only 7.6% or about 769,000.

Not much more impressive, however, is the past history of the growth in use of the neighborhood automatic laundries. The AIL-P&G survey points out that the increase over the past few years was in the same relative proportion with the population. These users tallied to about 12% of the urban families.

At least 7% of the families use the neighborhood automatic stores; about 5% use units in their apartment houses.

But although the 8 to 9-lb. washers did not consume laundry sours and such, as did the commercial laundries, sales of soaps, synthetic detergents and bleaches received a hefty upward nudge with the influx of post-World War II home-size neighborhood automatics. Reason: compensation by chemicals for less mechanical action than occurs in the large commercial machines.

Add, too, the fact that the housewife and many of the automatic store attendants (unlike the large power laundries) frequently don't know how much of the nonfoaming synthetic detergents to use, often add more of the nonionics than they need. And that's

* Based on a survey jointly sponsored by the American Institute of Laundering and Procter & Gamble; conducted by the Psychological Corp. (N.Y.). An urban area is defined as a town having a population of 2,500 or more, or a built-up area adjoining such a town.

A complete user is one who sends all of the regular family wash (excluding lingerie, hose, blouses, woolen sweaters, etc.) to the laundry all the time.

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all added strength to a bounding detergent sales curve.

The far-sighted in the laundry industry see still another trend emerging: some of the powered family laundries are beginning to decentralize their plants, are setting up branch units of the open-end 25 to 50-lb. machines at strategic neighborhood areas. Chemical industry significance of this trend: sours and bluing will be consumed in them just as in the centralized laundry, together with alkalis, bleaches, bluing, starch, etc.

Look Beyond: Although the scale of operations is increasing in the automatic neighborhood laundries, there is a great bulk of commercial laundering that was not covered in the AIL-P&G survey. These other segments of the laundry industry—institutional, linen supply, etc.—consume, of course, more laundry chemicals than do the commercial family and neighborhood laundries combined. Right now their pattern of chemical consumption continues along a normal, population-inspired, though unspectacular, upward path. Here's the current annual picture—and you can figure that a near-4% of the total dollar volume of business is spent for cleansing supplies such as soap, detergents, sours, bluing, starch, water-softeners:

Type of Laundry		Dollar Volume of Business (millions)
Commercial family		725
Institutional		809*
Hospitals	432	
Hotels	251	
Motels	94	
Institutions	32	
Linen supply		310
Neighborhood service stores		250
Industrial		100
Hand		100
Diaper service		100
Apartment building, military		Not available

Take soaps and detergents, for instance: nonhouseholds last year took about 15% (292 million lbs.) of total soap output, 20% (427 million lbs.) of synthetic detergent supplies. Of

* About 50-60% ($405 million) is done in the institutions' laundries; the remainder by linen supply, other outside agencies.

Desert Market for Chemicals

BRITISH probing of Middle East markets is behind the Federation of British Industries Trade Fair in Baghdad, Oct. 25-Nov. 8. Pipes *(see cut)* may be a prime market-opener; will carry chemical refrigerants in air-conditioning plant, ice-making equipment, etc. A 30-x30-ft. ice-skating rink in the desert will be one of the novel features of the fair. Illustrating the two-way nature of Anglo-Iraqi trade will be an Iraq Pavilion displaying that country's main exports to Britain.

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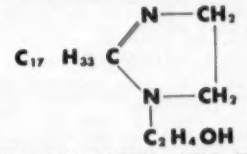

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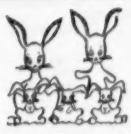

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AUGUST 28, 1954

ALLIS-CHALMERS MANUFACTURING CO. 47-50
Agency—Compton Adv. Inc.

AMERCOAT CORP. 25
Agency—Willard G. Gregory Co.

AMERICAN MINERAL SPIRITS CO. T74
Agency—Leo Burnett Co., Inc.

AMERICAN POTASH CO. 28
Agency—The McCarty Co.

ATLANTIC REFINING CO. 65
Agency—N. W. Ayer & Son

BAKER & ADAMSON PRODUCTS GENERAL CHEMICAL DIV., ALLIED CHEMICAL & DYE CORP. ..... Third Cover
Agency—Atherton & Currier, Inc.

BAKER CASTOR OIL CO. 70
Agency—Samuel Croot Co.

BALTIMORE & OHIO RAILROAD CO. 82
Agency—Richard A. Foley Adv. Agency

BARRETT DIV., ALLIED CHEMICAL & DYE CORP. 23
Agency—McCann-Erickson, Inc.

BARECO OIL CO. 58
Agency—White Advertising Agency

BARNEBEY-CHENEY CO. T80
Agency—Byer & Bowman Adv. Agency

BERKSHIRE CHEMICALS, INC. 52
Agency—Sterling Adv. Agency

BIOS LABORATORIES, INC. B93
Agency—Firestone Adv. Inc.

BLAW-KNOX CO. 53
Agency—Ketchum, MacLeod & Grove, Inc.

BLOCKSON CHEMICAL CO. 61
Agency—William Balsam Advertising

BORDEN CO. 34
Agency—Fuller & Smith & Ross, Inc.

BUFFALO FORGE CO. 30
Agency—Melvin F. Hall Adv.

CARBIDE & CARBON CHEMICALS CO. A DIV. OF UNION CARBIDE & CARBON CORP. 29, T85
Agency—J. M. Mathes, Inc.

CHEMICAL ENGINEERING 32, 33

COMMERCIAL SOLVENTS CORP. 57
Agency—Fuller & Smith & Ross, Inc.

COSDEN PETROLEUM CORP. 31
Agency—Craig & Webster Adv. Agency

COWLES CHEMICAL CO. T86
Agency—The Bayless-Kerr Co.

DAVENPORT MACHINE & FOUNDRY CO. B86
Agency—Bawden Bros.

DAY CO., J. H. 19
Agency—Strauchen & McKim

DORR CO. 42
Agency—Sutherland-Abbott Adv.

DOW CHEMICAL CO. 73
Agency—MacManus, John & Adams, Inc.

DU PONT DE NEMOURS & CO., INC., ELECTROCHEMICAL DEPT. 46
Agency—Batten, Barton, Durstine & Osborn, Inc.

DU PONT DE NEMOURS & CO., INC. POLYCHEMICALS DEPT. 77
Agency—Batten, Barton, Durstine & Osborn, Inc.

DU PONT DE NEMOURS & CO., INC. PEROXYGEN PRODUCTS 91
Agency—Batten, Barton, Durstine & Osborn, Inc.

DURIRON CO. 21
Agency—Kircher, Helton & Collett, Inc.

EL DORADO OIL WORKS 22
Agency—Sidney Garfield & Assoc.

ENJAY CO. INC. 15
Agency—McCann-Erickson, Inc.

ETHYL CORP. 9
Agency—H. B. Humphrey, Alley & Richards, Inc.

EXACT WEIGHT SCALE CO. B85
Agency—Byer & Bowman Adv. Agency

FISHER CHEMICAL CO., INC. 3
Agency—Sterling Adv. Agency

FRITZSCHE BROS. INC. 60

GREEFF & CO., R. W. B83
Agency—J. Hayden Twiss Adv.

GENERAL AMERICAN TRANSP. CO. 10
Agency—Weiss & Geller, Inc.

HALL CO., THE C. P. 62
Agency—Cruttenden & Eger Adv.

HARDESTY CHEMICAL DIV. INC. 4
Agency—Terrill, Belknap & Marsh Assoc.

HARSHAW CHEMICAL CO., THE 1

HERCULES POWDER CO. 2
Agency—Fuller & Smith & Ross, Inc.

INTERNATIONAL PAPER CO. 81
Agency—Picard Adv. Co.

JEFFERSON CHEMICAL CO. 43
Agency—Hazard Adv. Co.

KOPPERS CO. (CHEMICAL DIV.) 5
Agency—Batten, Barton, Durstine & Osborn, Inc.

LIQUID CARBONIC CORP. 51
Agency—Fletcher D. Richards, Inc.

LUCIDOL DIV., WALLACE & TIERNAN, INC. T84
Agency—Landsheft & Barber, Inc.

MATHIESON CHEMICAL CORP. ..... Second Cover
Agency—Doyle, Kitchen & McCormack, Inc.

McLAUGHLIN GORMLEY KING CO. B80
Agency—The Alfred Colle Co.

MINNEAPOLIS-HONEYWELL REGULATOR CO. 55
Agency—The Aitken-Kynett Co.

MONSANTO CHEMICAL CO. PLASTICS DIV. 92
Agency—Gardner Advertising Co.

NATIONAL LEAD CO. 75
Agency—Marschalk & Pratt Co.

NATIONAL STARCH CO. 67
Agency—G. M. Basford Co.

NIAGARA BLOWER CO. 26
Agency—The Moss-Chase Co.

OHIO-APEX DIV., FOOD MACHINERY & CHEMICAL CORP. T83
Agency—Advertising, Inc.

OLDBURY ELECTRO-CHEMICAL CO. B74
Agency—Briggs & Varley Adv.

PACIFIC COAST BORAX CO. 71
Agency—Howard M. Irwin & Assoc.

PENNSYLVANIA INDUSTRIAL CHEMICAL CORP. 63
Agency—Walker & Downing Adv.

READ STANDARD CORP. 72
Agency—W. H. Long Co.

REFINED PRODUCTS CORP. 68
Agency—James Civille Adv.

RHODIA, INC. 64
Agency—J. Hayden Twiss Adv.

SINDAR CORP. 66
Agency—Hazard Adv. Co.

SOLVAY PROCESS DIV., ALLIED CHEMICAL & DYE CORP. 27
Agency—Atherton & Currier, Inc.

STAUFFER CHEMICAL CO. 24
Agency—J. Hayden Twiss Adv.

STOKES MACHINE CO., F. J. 59
Agency—John Mather Lupton Co.

SWIFT & CO. 79
Agency—Russell T. Gray, Inc.

TENNESSEE VALLEY AUTHORITY B84

TRUBEK LABORATORIES, INC. 45
Agency—Merready, Handy & Van Denburgh

UNION CARBIDE & CARBON CORP., CARBIDE & CARBON CHEMICALS CO. 29, T85
Agency—J. M. Mathes, Inc.

U. S. INDUSTRIAL CHEMICALS CO. 69
Agency—Sterling Adv. Agency

UNITED STATES STEEL CO. (COAL CHEMICALS) 6
Agency—Batten, Barton, Durstine & Osborn, Inc.

UNIVERSAL CHEMICALS CORP. T95
Agency—George T. Metcalf Co.

VANDERBILT CO., R. T. 54
Agency—P S Advertising, Inc.

WEST VIRGINIA PULP & PAPER CO. T93
Agency—Sterling Adv. Agency, Inc.

WITCO CHEMICAL CO. ..... Back Cover
Agency—Hazard Adv. Co.

WYANDOTTE CHEMICALS CORP. 88
Agency—Brooke, Smith, French & Dorrance, Inc.

tracers SECTION
Classified Advertising
H. E. Hilty, Mgr.

BUSINESS OPPORTUNITIES 102
CHEMICALS: Offered/Wanted 103
EMPLOYMENT 102
EQUIPMENT: Used/Surplus New For Sale 102
Wanted 102
MANAGEMENT SERVICES 102
SPECIAL SERVICES 102

ADVERTISING STAFF

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San Francisco 4 ..... Ralph E. Dorland, 68 Post St., Douglas 2-4600
Boston 16 ..... 350 Park Square Building Hubbard 2-7160
Detroit 26 ..... 856 Penobscot Bldg., Woodward 2-1793
Pittsburgh 22 ..... 738 Oliver Bldg., Atlantic 1-4707
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MARKETS. . . . . .

these amounts, commercial laundries consumed about 135 million lbs. of the soap, and shared with dry cleaning plants some 38 million lbs. of syndets.

The largest users of synthetic detergents at present are the housewife and the neighborhood automatic laundries. One laundry official says that soap in the automatics will become a rarity. The "built" nonionic nonfoaming detergents are making good headway in the automatic field.

But further underscoring the commercial field's preference: over three times as many linen supply houses use soap as use detergents in their laundry water.

In the washing process, the laundryman has long neutralized acidity of laundry (from perspiration, previous washings) and emulsified fatty materials by addition of alkalis—trisodium phosphate or soda ash for slightly soiled wash; the sodium silicates—metasilicate, sesquisilicate or orthosilicate—for moderately soiled laundry; caustic soda for the heavily soiled fabrics.

But the customer isn't satisfied with just clean clothes; he wants them white. And that means bleaching, usually with sodium hypochlorite. (A somewhat more stable bleach attracting attention lately is 1,3-dichloro-5, 5-dimethylhydantoin.)

Laundry sours, too, are used in commercial laundries to counteract the yellowing tendency of residual bicarbonate alkalinity when white cellulose goods come under a hot iron.

The sours market is divided among three top silicofluorides—50% to sodium, 20% to ammonium, and 15% to zinc silicofluoride. (Oxalic acid, or an acid fluoride, is often used as a rust-removing sour.)

For the whiter white, commercial laundries employ as bluing the rosaniline blues and the acid violets, whereas the housewife usually gets along with soluble Prussian blue. Then there are the optical bleaches that give a yellow-neutralizing bluish or bluish-green tint under activation by ultraviolet light.

If the decentralized open-end unit laundries can woo laundry loads from the large power laundries, the outlook will be good for increased consumption of chemicals per pound of wash. And basic chemical and soap manufacturers should look for greater specialization of product to meet particular laundry needs. That will mean more dependence on the chemical jobber, who has the know-how and experienced staff to deal with customers' problems.

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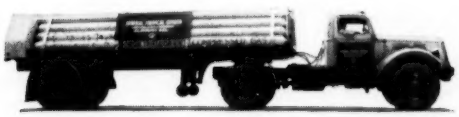

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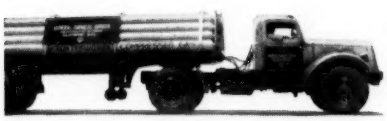
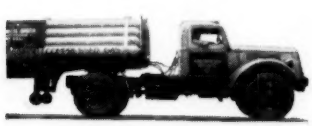
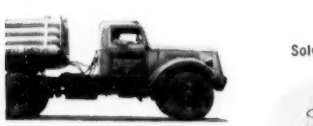


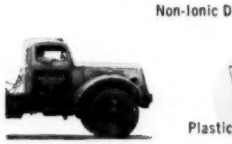
Phenol Alkylates



Synthetic Rubber



Resins



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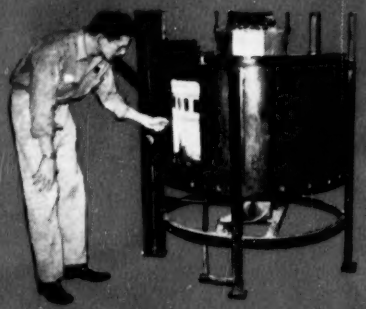

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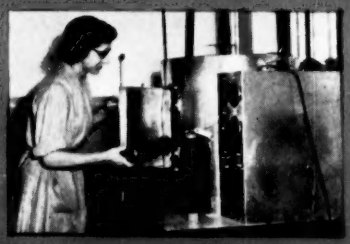
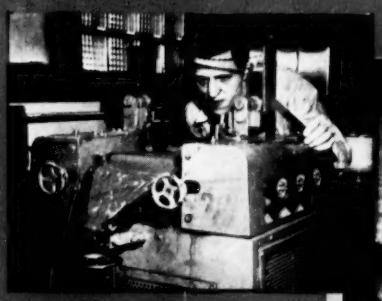
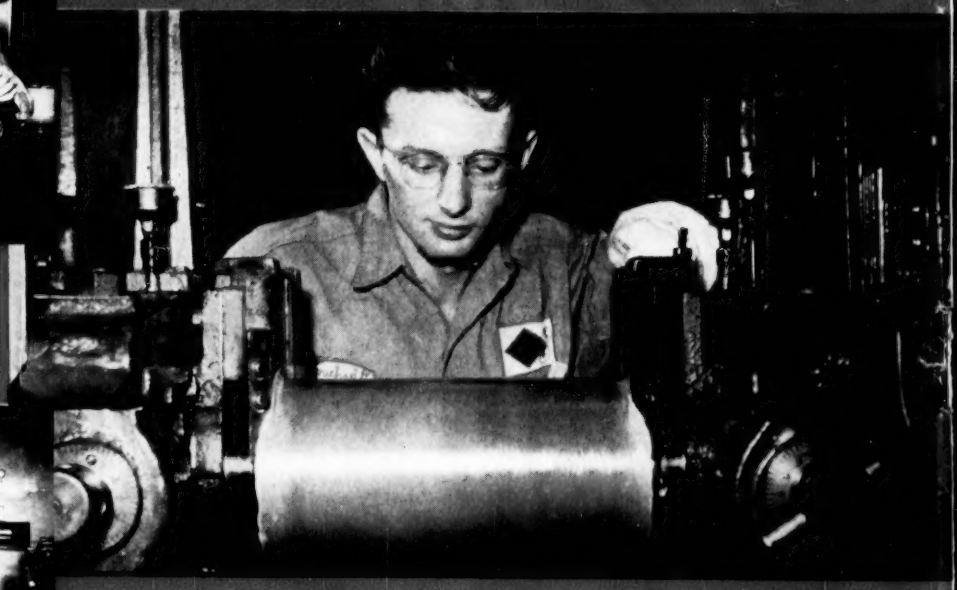


Effectiveness of Sunshine® anti-sunchecking wax in rubber being checked in Ozone Tester.

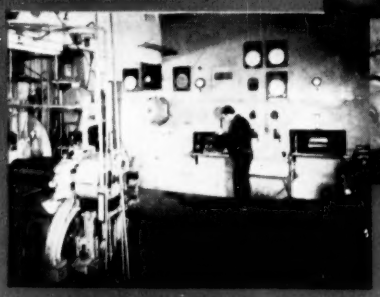
Testing greases in grease oven under controlled cooling rate.



Three-Roll Mill mixes experimental paint for measuring flatting, bodying and suspension action of materials.



Compounding plastic formulations for subsequent evaluation.



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